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COOPERATIVE RESEARCH WITH ADEQUATE SUPPORT

Editor's note: It is becoming apparent from our many attempts to study education scientifically that single and isolated studies, important as they are, may not be equal to the necessities of a complex field like education. The author suggests a plan of cooperative research among individuals of like interests, adequately financed.

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RESEARCH in education is determined to a large degree by purely accidential, irrevelant and trivial considerations. It is a commonplace observation that much of it deals with minor problems, the solution of which does not matter much one way or the other. For example, a good many studies have been made of the question whether it is better to add up or add down a column of figures. The issue never excited me; in fact, I do not know which way has been found better because I always add both up and down in order to check. Much research in methods is of this type. It deals with minor details of procedure, which frequently yields inconclusive results, and which would not make much difference whichever way it came out. The same is true of research in other fields, in administration, history, finance, individual differences, learning, child development or what not.

This situation is probably not peculiar to education. The causes, also, are doubtless the same in education and in other fields of research. I venture to suggest that the chief causes are the fact that research is so largely carried on by novices, by individuals working alone and without adequate support. A very large proportion is done by doctors' and even masters' candidates. They are "learning by doing", and hence the doing is not of a very expert kind. They must choose problems that are limited in scope, as their mentors rightly advise. In order to play safe they usually select prob-

lems which differ only slightly from those which have been previously studied, and use techniques which are already on the market. Having once learned to "produce" this kind of research they are likely to produce more similar "pieces of research" after they get on the job of teaching, if indeed they do not rest on their laurels. The circumstances favor this procedure. Time is limited, financial support is meager, and the pressure to publish creates a desire to have as many titles to one's credit as possible. To combine with others in the attack on larger problems would deprive the individual of credit, except in those cases in which he can get his students to do all the work and accept the junior end of joint authorship. So, though the student may start with a Quixotic desire to solve some of the major problems of education, he commonly yields to the influence of the circumstances under which he works and settles down to a routine investigation of minor problems, if indeed he does not succumb entirely and allow his first study to be his last.

How far it may be possible to overcome the force of the circumstances and secure a combined attack on major problems, backed by adequate resources, I do not know. One thing I do know, and that is that we shall not secure an improvement in research unless we recognize its desirability and urge it in season and out. Some of the remedies are within our own power to effect; and I believe that if we apply these remedies we shall go far toward obtaining adequate financial support.

It is unlikely that very much can be done to make greater use of degree candidates in large scale research. They must work with a reasonable amount of independence in order to deserve the reward of the degree. But they cannot be turned loose on problems of major importance because they do not have the proved ability necessary to warrant giving them the necessary responsibility and support. Some professors do use their doctors' candidates as hewers of wood and drawers of water, but this is exploitation, not education.

The chief remedy which is within the grasp of the scientific workers themselves is to adopt a change of attitude toward research. Instead of being impatient individuals, anxious to put out a multitude of studies under our own names, we must be willing to wait and to share—at least part of the time. We preach objectivity, detachment, cooperation, but we too often practice egoism, prejudice, self-aggrandizement. In so doing, we fail to achieve

anything noteworthy by way of research and hence even fall short of attaining the very ends we are striving to reach.

To relieve the argument of mere sermonizing, it is necessary to go beyond generalities and give illustrations of major problems which need to be studied and which require long-time cooperative research. Many examples could be given. I shall mention only two in detail. These two are chosen from the field with which I am best acquainted, not because it is more important than others, but because I can speak of it more intelligently.

The first problem is the mental growth of children and youth, including intellectual, emotional and social development. We know much less than we should on all phases of mental growth. For instance many questions about growth in ability remain unanswered. It is commonly believed that children reach their full intellectual stature at fourteen years of age or earlier. There is good evidence to the contrary but the question is not settled conclusively or finally. It is commonly believed that below average children develop more slowly than their brighter companions and stop earlier. Again, there is evidence against this belief but many are not convinced. The issues are worth settling.

These and similar questions about mental growth are usually studied by the short-cut cross section method. Groups of different children of different ages are tested, and comparisons are made between them by constructing tables and curves of growth. Serious fallacies are committed by this procedure which are widely recognized but generally ignored. For example, this method requires that the groups at each age shall represent an equivalent sampling of the entire population to that of every other age. It is seldom, if ever, certain that this is true, and it is often certain that it is not true. Again, the curves constructed from the averages of groups tell us nothing about the curves of growth of individuals, yet it is commonly blithely assumed even by acute specialists in the study of growth, that they tell us all we need to know. The construction of individual curves of physical growth many years ago showed, for example, that we could not tell what the adolescent spurt of an individual child would be from curves constructed from averages. We have enough data to show that the same is true of mental growth, but not enough to show in detail what the types of mental growth curves are.

Why do we not have the necessary information? Because it is almost a life-time job to get it, and it would require an outlay that few investigators

could command. To be reasonably complete, such a study should extend from the pre-school years to the early twenties, a period of sixteen or eighteen years. It should be preceded by a thorough-going study of the techniques of measurement to be used through the study, because, in a longitudinal study it is hazardous to change horses in mid-stream. It must start with many more individuals than are needed to make a respectable group at the end, because many will be lost through removal and a few through death. It should be carried on throughout the entire period by the same administrative direction. It should provide for complete analysis of the results at the end of the period of record taking.

Such an undertaking should obviously have some type of institutional or associational backing and direction. An individual might start it but there would be no assurance that he could finish it. It would be risky for a foundation or an institution to appropriate the money for such an undertaking if an individual were depended on to carry it through. Some provision would have to be made for continuity of effort and direction. The details could be worked out if the possibility of support for such a study seemed immanent.

The second illustration is also drawn from the field of fundamental problems. It appeared for a time that the problem of heredity and environment, at least as a subject of controversy, had been laid to rest. But it has recently been brought to life and is being debated at this very meeting under the aegis of the National Society for the Study of Education with a warmth as great as ever. Thirteen years ago the same Society issued a yearbook on the same subject and research has been going on steadily before and since. Why is the question not settled?

The answer is not far to seek. The problem is extraordinarily difficult and involved. The interpretation of much of the findings of studies is ambiguous. There is room for honest students to differ, even though some of the differences may be ascribed to prejudice and the habit of placing the burden of proof on the opponent. More conclusive evidence is needed.

This is another case in which long-time follow-up studies are needed. We need to find out what happens to an individual of known ability or personality under specified form of treatment through a given period of time. In most studies, it has been necessary to infer what the individual's characteristics were at an earlier date and what influences were brought to bear

upon him from records which are all too incomplete. In cases in which individuals are tested at the beginning and end of a long interval, the comparability of the tests is not all that could be desired and the nature of the intervening experiences is not fully known. The effect of environment can therefore not be precisely determined.

To obtain a more conclusive answer to the question we must find a way, first, of specifying more accurately the original constitution of the individual and, second, of recording more exactly the environmental influences which are brought to bear upon him. Now human traits can be measured only by comparison of performances. There is no absolute measure and there is no measure of ability or personality in itself. There is no way, therefore, of determining the constitution of an individual or of a group of individuals by measurement alone. However, there is one case in which the relative constitution of two individuals is known, because it is the same, namely, the case of identical twins. The difference in constitution between identical twins is zero. Hence we can attribute the differences between them to environment or to hypothetical differences in development. But merely to attribute such differences as may be found between identical twins to environment in a blanket fashion is not very satisfactory. To clinch the argument we should be able to connect specific environmental conditions with specific differences in ability or personality. The best way to do this is to set the conditions experimentally.

Here is a suggested plan. Find a number of identical twins who are to be placed out for adoption. Secure permission to place them in homes selected by the research agency. Find homes which are contrasted in some specified respect or respects, as in cultural level as indicated by occupation, education and evidences of culture in the homes, or in other ways, as emphasis on literary, artistic, scientific or practical interests and pursuits. Enlist the cooperation of the homes in giving the children specified kinds of training and education, in keeping records and permitting the administration of batteries of tests at regular intervals. Follow up a sufficient number of pairs as long as may be convenient, not less than fifteen years. Then see how far the development of the two members of each pair diverges in the direction of the divergence in the environmental influences under which they live.

Such an investigation would be fairly expensive. A rough estimate would indicate about $275,000. But this is less than is spent on enterprises

of less fundamental character and importance. It would take fifteen or twenty years, but this is little longer than the time since the preparation of the yearbook on Nature and Nurture. It would have to be a cooperative study, but I believe the cooperation of the chief scientists interested in this problem could be enlisted. The project is, I think, worthy of consideration.

I have used theoretical problems as illustrations. This is not to the disparagement of more practical problems. They deserve investigation as much as do the more theoretical, and they require the same continuity and breadth of cooperative attack. Furthermore, and this is vital, they need to be attacked in the same objective and unbiased spirit and method. Too much of our research, both theoretical and practical, is carried on to prove a case or to substantiate a doctrine. We first make up our minds what kind of educational procedure is desirable and then look for evidence to support it. This will get us nowhere except around in a circle. The more highly organized and well supported research is, the worse it is, if its finality is marred by preconceived ideas as to the outcome. The kind we need to solve our many problems is that which is pursued with scientific impartiality, through cooperative attack, supported by adequate means.

THE RELATIONSHIP OF AGE, EXPERIENCE, FORMAL PREPARATION AND MARRIAGE OF COLLEGE AND UNIVERSITY PROFESSORS WHILE BECOMING ESTABLISHED IN THE PROFESSION

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Editor's note: Almost all persons are interested in getting ahead in one respect or another. The author presents certain data relative to the background experiences of college and university professors who have become established in the profession.

THE study of the tendencies revealed concerning the relationship of age, experience, formal preparation, and marriage of college and university professors while becoming established in the profession was motivated by these questions: (1) Have successful professors delayed marriage until after their formal preparation was complete? (2) Did they obtain their professorships after an "apprenticeship" in the public schools or other educational institutions of grade-level lower than the college or university? (3) Were their advanced degrees obtained before or after entering college teaching and what was their status in the profession at the time of marriage, and at the time these advanced degrees were obtained?

One way to learn the answers to these questions is to see the courses that have been followed by those college and university professors who have attained success and distinction. In the graduate schools of universities today are young scholars who are now planning careers in college teaching. It was thought that the patterns set by successful professors might serve as models worthy of emulation even though the model practices of a decade or so ago may not be valid or desirable for the novice of today. It is not the writer's purpose, then, to attempt to determine standards in regard to experience, advanced degrees, and marriage for aspiring young college professors in order that they may best succeed in college teaching; rather, the writer has been concerned only with what successful professors have done in regard to these matters while they were becoming established in the profession. Interesting as it is to generalize as to the best and most expedient manner of becoming a college professor, it is still more interesting to look into the composites of the practices in the careers of those who have been successful and have gained distinction.

The source of information for this study was the latest volume of *Who's Who in America (1937–1938)*[1] in which the biographical sketches of 500 college and university professors were examined. The cases were selected by controlled sampling from the entire volume. As a check upon the reliability of the data, an additional hundred cases were examined and compared with the original five hundred. Since this checking shows no great amount of disagreement, it has been assumed that the data are reliable and that the results would remain about the same if the entire array of sketches[2] had been used. The professors used in the study are now employed in 217 representative colleges and universities located in all forty-eight states and the District of Columbia. In 1938 their ages ranged from 31 to 82 years, the median was fifty-four. While the writer admits that many successful and superior college and university professors may not be given recognition in *Who's Who,* he does contend that appearance in the volume is some index of success and distinction and that, on the whole, perhaps is as good a criterion as could be had without involving additional investigation and expense.

The degrees of the 500 professors in this study are shown in Table I. The information clearly indicates that the greater number have secured the

TABLE I

THE EARNED DEGREES OF 500 PROFESSORS[3]

Degree	Number	Percent
No degree	0	0.
None higher than Bachelor	22	4.4
None higher than Master	79	15.8
With earned Doctorate	399	79.8
Total	500	100.0

[1] Marquis, Albert Nelson, Ed. *Who's Who in America,* Vol. 20 (Chicago: The A. N. Marquis Company, 1938).

[2] The number of biographical sketches of college and university professors is estimated to be between 5,000 and 6,000.

[3] Some of the professors reported more than one Bachelor or Master's degree. In each case, the earliest degree at each level was considered in this report. In the original plan for this study, provision was made to record those professors who had earned only a normal-school diploma but in no case did this occur.

The degrees are not entirely indicative of all formal preparation of these professors. In several instances it was noted that advanced study has been pursued beyond the highest degree but since it was almost impossible to take this into consideration, the information was discarded.

highest degree and that none have no degrees at all. The small percentage of those with no degree higher than the Bachelor is not surprising and it is interesting to note from the data that these 22 professors are all over seventy years of age and that they began their careers at a time when the Bachelor degree was tolerated as being sufficient for college teaching. Further, 60 per cent of these 22 are professors of law, in which field the Bachelor degree is easily an equivalent of one year of graduate study.

The extreme and median ages at the time the various degrees were secured are shown in Table II. The two-year increment of the extreme low

TABLE II

THE EXTREMES AND MEDIAN AGES OF 500 PROFESSORS AT THE TIME THEIR DEGREES WERE OBTAINED

Degree	Low	High	Median
Bachelor	18	37	23
Master	20	51	25
Doctorate	22	70	31

age is most interesting but it is not the record of any individual. The extreme high age of 70 years for the Doctorate was the only case in which the degree was delayed this late, the next highest age being at 53 years. The average professor graduated from high school or its equivalent at the age of 19 and went directly to college. After securing his Bachelor degree four years later at the age of 23, he pursued graduate study and obtained the Master's degree at 25, two years after the Bachelor degree. He then either taught as an instructor in a college or served an assistantship until he had earned the Doctorate degree.

Of the 399 professors who secured the Doctorate degree, 70 percent obtained all their advanced degrees within a period of ten years or less; 94 percent within a period of twenty years or less. The data show that 35 percent continued their preparation without interruption until the Doctorate was earned. Sixty-five percent were unable to continue, either by choice or necessity, without some experience in teaching their chosen fields.

In order to determine the professional status at the time these degrees were obtained, it was necessary to consider the teaching field as being at least of pre-college and college grade. But since these two divisions were

not indicative of the difference between the small and average college and university as against the larger and superior college and university, it was necessary to assume some arbitrary distinction between the average and the superior institutions. This distinction may be imperious but it is based upon the assumption that a professorship in the superior college or university is more desirable and has greater professional potentialities than one in the average college or university of less recognition. Taking the situation by and large, no doubt that on the whole it is safe to assume that the better professors are employed in the superior colleges and universities. However, this assumption does not deny that professors of equal calibre may be found in the small or average college or university. Then, with these qualifications in mind, the writer has used the list of colleges and universities selected by the American Council of Education as being distinguished institutions and has considered all others as average.[4] It is very unlikely that anyone will disagree that this list contains the outstanding colleges and universities in America even though there may be some disagreement in regard to institutions omitted.

Among the first questions that arise in considering the professional status of these 500 professors is the one in regard to the number who taught before becoming college professors and the number who went directly into college teaching without previous experience in the public schools or other kinds of schools of pre-college grade. Only 149 or 29.2 percent first taught in schools of pre-college grade. This leaves a remainder of 351 or 71 percent who went directly into college teaching. Tables III, IV, and V show the degrees held at the time these professors went into the three divisions of teaching—Pre-college, Average Professorship, and Distinguished Professorship. In Table III is shown the respective degrees at the time 104 professors began teaching on the Pre-college level. Forty-five of the 104 professors who had experience in the public schools or other schools of pre-college grade, taught before they obtained the Bachelor degree, so the remaining 30.2 percent cannot be shown in Table III. It is interesting to note that of the entire group of 500 professors, only 29.2 percent had

[4] *The Americana Annual* (New York: American Corporation, 1934), pp. 277–279. In this list appear colleges and universities selected for their assumed superiority in graduate work. Assumption has been made that by having superior graduate work, these colleges and universities also have superior undergraduate departments, although there may be a number of exceptions. At least these schools do attract the outstanding scholars to their faculties as a mere cursory survey will show.

TABLE III

THE DEGREES OF 104 PROFESSORS WHO TAUGHT ON PRE-COLLEGE LEVEL

Degree	Number Before	Percent Before
Bachelor	88	59.
Master	14	9.3
Doctorate	2	1.5
Total	104	69.8

teaching experience previous to college teaching and that of this group less than half of them taught before they had obtained the Bachelor degree. In other words, only 9 percent of this group of 500 college and university professors began teaching with the minimum preparation and so progressed through to college teaching. Insofar as the greater percentage of these professors were eligible for teaching in the public schools at a time when the Bachelor degree was not requisite, this information seems to indicate that for the most part they were not interested at all in teaching except on the college level. In Table IV is shown the respective degrees at the time 293

TABLE IV

THE DEGREES OF 293 PROFESSORS AT TIME OF FIRST PROFESSORSHIP IN AN AVERAGE COLLEGE OR UNIVERSITY

Degree	Number Before	Percent Before
Bachelor	109	36.3
Master	98	32.3
Doctorate	86	28.6
Total	293	97.2

professors obtained their first professorship in an "Average" college or university. Eight, or 2.8 percent, had a professorship in an "Average" college or university before they earned their Bachelor degree. In Table V is shown the respective degrees at the time 324 professors obtained their first professorship in a "Distinguished" college or university. Eight or 2.4 percent secured their first professorship in a "Distinguished" college or university before they had earned their Bachelor degree.

TABLE V

THE DEGREES OF 324 PROFESSORS AT TIME OF FIRST PROFESSORSHIP IN A DISTINGUISHED COLLEGE OR UNIVERSITY

Degree	Number Before	Percent Before
Bachelor	63	18.9
Master	94	28.3
Doctorate	167	50.4
Total	324	97.6

The data in Tables IV and V show that professors who obtained their first professorship in a "Distinguished" institution have earned higher degrees previously to their election than those elected for their first professorship in an "Average" institution. Fifty and four-tenths percent had their Doctorate degree when elected to the faculty of a "Distinguished" institution while only 28.6 percent had their Doctorate degree when elected to the faculty of an "Average" institution. Further, a larger percentage of professors was elected to faculties of "Average" colleges and universities with no degree higher than the Master's than was elected to the faculties of "Distinguished" colleges and universities. Only half as many were elected to "Distinguished" institutions with only the Bachelor degree as were elected to "Average" institutions. And, in keeping with the ratio, almost twice as many are elected to "Distinguished" institutions with the Doctorate degree as are elected to the "Average" institutions. In generalizing from the data in Tables III, IV, and V, the writer believes sufficient evidence is shown to support the contention that the superior colleges and universities have higher standards of formal preparation, as represented by advanced degrees, than the average or smaller colleges and universities.

A number of interesting and pertinent facts brought out in this study and which need no explanation, are given here in statement form:

1. Thirty-three percent of the 500 professors never secured election in a "Distinguished" college or university.

2. Fifty-nine and six-tenths percent of the 322 professors elected in "Distinguished" institutions were elected without previous teaching experience. Of the 40.4 percent who had experience when elected, only 25.6

percent had taught in the public schools or schools of grade-level lower than that of college.

3. Sixty-seven and three-tenths percent of the 301 professors elected in "Average" colleges and universities were elected without previous experience in teaching. Of the 32.7 percent who had experience when elected, only 32.6 percent had taught in the public schools or schools of grade-level lower than that of college.

The information in the above three statements reveal that "Distinguished" colleges and universities elect fewer professors with previous experience than "Average" college and universities, and that of those elected with previous experience, a smaller percentage have had experience in the public schools or schools of grade lower than that of college.

The relationship of time of marriage to degrees is shown in Table VI. Only 28 or 5.6 percent of the 500 professors were married before they had

TABLE VI

THE DISTRIBUTION OF DEGREES IN RELATION TO THE TIME OF MARRIAGE

Degree	Number	Percent
Before Bachelor	28	5.6
After Bachelor	138	27.6
After Master	122	24.4
After Doctorate	212	42.4
Total	500	100.0

obtained their Bachelor degree and 42.4 percent were married after their highest degree was obtained. Of the 149 professors who taught in the public schools or schools of grade-level lower than that of college, only 8 percent were married before they had obtained their first position. Of the 301 professors who obtained their first professorship in an "Average" college or university, 15 percent were married before they had been elected. Of the 322 professors who obtained their first professorship in a "Distinguished" college or university, only 11 percent were married before they had been elected. It is easy to generalize from these data and conclude that the average college and university professor has delayed marriage until after he

has become established in the profession. Eighteen and four-tenths percent were married before their first position: 81.6 percent after their first position.

In conclusions the questions which motivated this study may be answered as follows:

1. Successful professors have delayed marriage until after their formal preparation was competed.

2. They did not obtain their professorships until after advanced degrees were secured.

3. They did not serve an "apprenticeship" in the public schools or other educational institutions of grade-level lower than that of the college or university.

AN EXPERIMENTAL INVESTIGATION OF THE EFFECTIVENESS OF CERTAIN DIAGNOSTIC AND GUIDANCE PROCEDURES WHEN APPLIED IN CASES OF LOW SCHOOL ACHIEVEMENT

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Editor's note: Much has been written in recent years about guidance procedures. The author's present experimental data relative to the value of certain diagnostic and guidance procedures when applied to secondary school pupils.

OVER a period of several years the authors have been working with high-school pupils and have been concerned, as have countless other teachers, over those pupils whose achievement is inferior to their estimated capacity to achieve. Consideration of these pupils in any school system must lead to an awareness of two specific problems: how to determine the causes of low school achievement, and how to bring about correction of the contributing factors. The present report is of an investigation carried on in Wisconsin High School during the 1938–1939 school year in an attempt to discover the difficulties experienced by low achieving high-school pupils and to effect a correction of these difficulties through the application of various guidance services adapted to individual pupil needs. In addition to these primary problems, it was hoped that the investigation might produce inferences as to the desirability of increasing the guidance training provided in the teacher-training program.

In order to study this problem, a group of pupils whose scholastic achievement was found to be inferior to their capacity to achieve was selected, their problems were diagnosed through the use of various objective measures and individual interviews, and the revealed difficulties were then attacked by the pupils themselves with the assistance of trained case workers.

THE SELECTION OF SUBJECTS

The high school in which the pupils were observed commonly makes use of the disparity technique developed by H. H. Ryan[1] to determine the

[1] Ryan, H. H. *A Disparity Technique—A Method of Gauging Achievement in School.* Excerpt from Ph. D. Thesis, Univ. of Chicago, Chicago, Ill. (1932).

extent to which individual pupils deviate in their actual achievement from the achievement which might normally be expected of them in terms of their intelligence quotients. The assumption is made that there is a high correlation between a student's ability to react to a mental test and his ability to do the academic work of the high school. The correlation of intelligence with marks in academic subjects is generally high, usually from 60 to 75. Academic subjects are distinguished from the non-academic on the basis of the prominence of the uses of materials, tools and machines. A prediction table is designed to indicate the relation of specific I. Q. scores to actual achievement scores. To get an expression of the true achievement the subject's (students) marks were interpreted numerically by assigning honor point values as illustrated: A = 3 honor points; B = 2; C = 1; D = 0; F or Con = — 1. Incompletes were not counted in the computation because they did not actually represent any level of scholarship. By adding the numerical values of the subjects' marks for the marking period and dividing the sum by the number of marks received the true achievement was secured. The difference between this true achievement figure and the subjects' predicted achievement results in the disparity figure. The maximum or positive dispersion may become 3, a negative dispersion is likewise possible. As an example: A boy receives 1 A, 2 C's, 1 D, a total of 5 honor points. Dividing this by 4, the number of subjects he carries, we secure 1.25 true honor points earned. From the prediction table his I. Q. indicates he has a prediction of 2.00 honor points (or a B average). The case is dispersing — 75 honor points.

The operation of this technique between counselor and student provides an opportunity for the counselor to meet the student with something more or less objective to discuss, and although its primary motive is educational upgrading, many personal, social and vocational adjustment implications may be brought to light.

The disparity technique depends both upon school marks and upon intelligence quotients. Both of these measures are doubtless subject to criticism and especially teachers' marks. However, their use as a criterion in determining quality of school achievement appears to be justified by the fact that they are the almost universally accepted measure of academic achievement in secondary schools and colleges and, as such, are probably the most influential of all factors in determining the school status

of students. Likewise, their force in the motivation of study is an ever present factor which contributes at times to increased school success and at other times to emotional distress. Consequently, the subjects for the investigation were selected from among those pupils whose negative disparities indicated that the quality of their school work was inferior to the quality which their intelligence enabled them to achieve.

In order to make the group a homogeneous one, to avoid the complications which are involved in dealing with pupils above or below normal in intelligence, and to escape that criticism of the disparity technique which alleges that it places a premium on normal intelligence, pupils were selected whose intelligence quotients fell within the range of one-half standard deviation on either side of the mean of the intelligence quotients for the school population from which they were drawn; i. e., between 110.59 and 125.79. From this group were selected thirty-two pupils showing the greatest degrees of negative disparity. All pursued roughly comparable curriculums since they were drawn from the upper four years of the high school. This group of thirty-two pupils were divided into two groups of sixteen each, as nearly comparable as possible in terms of intelligence, disparity, age, sex, grade, and curriculums. One group was considered as the Control group and its members were allowed to continue their regular school programs without being aware of their role in the investigation and with no other guidance services than those customarily provided by teachers and advisers. The other group was known as the Experimental group and the procedure followed with its members is described below. The comparability of these two groups in terms of the important selection factors of intelligence and disparity may be seen in Table I.

TABLE I

TABLE SHOWING COMPARISONS BETWEEN THE CONTROL AND EXPERIMENTAL GROUPS

Basis of comparison		Control Group	Experimental Group	Difference	Diff. / S. E. diff.
Number of cases		16	16		
School grades					
IX		5	3		
X		3	1		
XI		4	6		
XII		4	6		
Intelligence quotients	Means	118.19 ± 2.40	118.86 ± 1.45	0.67 ± 2.80	0.24
	S.D.'s	7.60	6.42		
Disparity at original marking period	Means	−82.31 ± 13.76	−93.94 ± 11.20	11.63 ± 17.72	0.66
	S.D.'s	55.03	44.81		
Disparity at second marking period	Means	−89.44 ± 12.87	−84.56 ± 7.63	4.88 ± 14.93	0.33
	S.D.'s				

As indicated in Table I, the Experimental and Control groups were comparable at the outset of the experiment on the basis of intelligence and disparity. On these bases, as well as on disparity at the end of the first nine weeks period, the differences were negligible. In no case does the ratio of the difference to the standard error of the difference approach the conventional limits of statistical significance set at 3.00, and in the case of the ratio of 0.66, it is interesting to note that the difference that does exist is weighted against the experiment.

THE DIAGNOSTIC PROCEDURES

Six trained and experienced case workers volunteered their services for the diagnostic and remedial work of the investigation. Each of these case workers had had course training in guidance theory and procedures, four were graduate students and two were seniors in the School of Education; two had had several years of teaching experience including guidance services and the others had had two semesters of practice teaching in which heavy emphasis was placed on work with individual pupils. Each worker was interested in extending his own experience in the administration of guidance services. The case workers were supervised and assisted by the writers through group and individual conferences during the period of the investigation.

The diagnostic procedures extended over the entire eighteen weeks of the investigation but were concentrated largely in the first nine weeks when the chief function of the case workers was the accumulation of information about the individual pupils. During the second period of nine weeks, the remediation procedures were most emphasized.

The diagnosing of pupil difficulties depended largely on the use of certain standardized diagnostic instruments which are but briefly described here since they are familiar to most readers and are adequately described in their respective manuals. These instruments included:

The Personality Inventory.[1] This inventory is composed of a series of questions which make up six scales measuring neurotic tendency, self-sufficiency, introversion-extroversion, dominance-submission, confidence, and sociability.

[1] Bernreuter, Robt. G. *The Personality Inventory,* (Stanford University, California: Stanford University Press, 1935).

The Adjustment Inventory.[2] This inventory provides four separate measures of personal and social adjustment. Specific difficulties in relation to home, social, health, and emotional adjustments may be diagnosed through the use of this inventory.

The Vocational Interest Blank.[3] This instrument is one by which individual patterns of interest may be determined. Through his answers to several lists of questions, an individual's interests may be interpreted with respect to general occupational areas and specific occupations. It is not a measure of abilities; as, intelligence or mechanical aptitude, but rather of the correspondence between present interests and the pattern of interests representative of various occupations or occupational groupings.

The Garretson-Symonds Interest Questionnaire for High School Students.[4] This questionnaire for boys is designed to show interests for different curricula; as, academic, commercial, and technical.

The Wrenn Study-Habits Inventory.[5] This inventory is an orientation device, diagnostic in nature. It consists of a battery of 69 statements covering study habits and attitudes and serves to identify good and poor study habits, the relative seriousness of poor study habits, the relative values of good study habits, the general quality of an individual's study habits, and to educate the student in the importance of specific habits of work.

The Iowa Silent Reading Test, Form (6). A reading test designed for high school and beginning college students and measuring speed and comprehension abilities in reading materials of graded series of difficulty.

The Progressive Education Association Interest Questionnaire, 8.2 Scale, 1938.[7] This questionnaire is designed for the purpose of diagnosing individual interests in terms of subject matter areas and in attitudes. The emphasis is on behavior; that is, the individual responds in terms of whether he likes an activity, has had experience with the activity, or would like to have experience with the activity. It is assumed that in this type of response pupils indicate more clearly their actual preferences and dislikes and that,

[2] Bell, Hugh M. *The Adjustment Inventory,* (Stanford University, California: Stanford University Press, 1934).

[3] Strong, Edward K. *Vocational Interest Blank,* (Stanford Univ., California: Stanford Univ. Press, 1930).

[4] Garretson, Oliver, and Symonds, Percival. *Interest Questionnaire for High School Students,* (New York: Bureau of Publication, Columbia University, 1931).

[7] Evaluation Staff of Progressive Education Association. *8.2 Scale Interest Questionnaire* (University of Chicago, Chicago, Illinois, 1936–1937).

from the 300 behaviors listed, interest patterns can be arranged which reveal the student's interests and activities and also his attitudes toward himself and toward social experiences. Such emotional attitudes as shyness, friendliness, antagonistic feelings, and leadership are presumed to be revealed by interest patterns.*

The Ryan disparity technique might properly be considered as an instrument for diagnosis but, since it was employed for the selection of subjects, it has been described in that connection.

In addition to these standardized measures, pupils were frequently interviewed by their respective case workers. The number of interviews varied but in no case were less than 12 individual interviews held with each pupil. Some of these interviews belong primarily to the remediation part of the total program but each also served to better acquaint the pupil and the case worker. During these interviews workers attempted to supplement and substantiate the objectively gathered data and to draw out the personal estimates of the pupils of their own problems. Teachers' judgments regarding each pupil were also obtained by the workers, both through conferences with teachers and advisers and through examination of school records containing such information. In instances where it was possible, parents were contacted for the purpose of securing information pertaining to home environment, home study habits, use of leisure time, social and personal habits, attitudes toward school, health data, and estimates of the pupil by the parents.

THE REMEDIAL PROCEDURES

The remedial treatment was conducted through individual conferences involving pupils and case workers. During these conferences case workers centered their attention on building up interests in school work by pointing out desirable values of various subjects and the relationships existing between subjects and pupils' interests and needs as revealed by the various inventories; on analysis of study difficulties, as revealed by the inventories and the pupils' own estimates of their problems, with the purpose of substituting better work habits, budgeting of time, attitudes toward distributed effort, and the like; on frank discussion of social

* Sheviakov, George. *An Interpretation of the Interest Questionnaire as an Index of Personal and Social Adjustment of Students* (Chicago, Illinois: Evaluation Staff, Progressive Education Association, University of Chicago, 1938).

and personal adjustment problems, as health, recreation, attitudes toward home and family, school mates, teachers, social affairs, and so forth, and on discussion of vocational ambitions through the consideration of vocational choices and the relation of school work and interests to those choices.

The conferences were always conversational in nature, except when pupils were taking tests, and every effort was made to keep them on a discussion basis rather than on a basis of advice-giving and taking. There was, however, no standardized conference procedure. Each case worker adapted conferences to each of his subjects in the light of his own best judgment or on suggestions from the writers who rendered whatever assistance they could.

THE RESULTS OF THE INVESTIGATION

The results of the process of diagnosing and treating the difficulties experienced by low achieving high school pupils may be considered in two ways; from the statistical evidences of decreased negative disparity, and from more or less subjective evidences of changes occurring in the pupils according to observations of case workers, teachers, and advisers. Each of these methods of evaluation has been employed and the results follow.

The status of the Control and Experimental Groups at the outset of the investigation and at the end of the first period have been shown in Table I. Table II shows the amount and significance of changes occurring during the period of the investigation with respect to the separate groups and comparisons of the groups.

From the evidence presented in Table II, it may be seen that the gain for the Experimental group during the first marking period (nine weeks) was not significant, but in a favorable direction. During this period emphasis was necessarily on the accumulation of data and the establishing of rapport and remedial treatment was not intensive. The Experimental group did, however, gain markedly during the second period of the investigation and during the total period. These gains were great enough to possess statistical significance and the obtained critical ratios of 3.45 and 3.92 indicate respectively 999.75 and 999.95 chances in one thousand that the changes which occurred were not simply due to chance fluctuations. In the Control group such changes did not occur and the negligible difference between the mean disparity of that group at the initial and final marking periods was in the direction of a slightly increased negative disparity.

TABLE II

SHOWING THE AMOUNT AND SIGNIFICANT OF CHANGES OCCURRING DURING THE PERIOD OF THE INVESTIGATION BETWEEN THE CONTROL AND EXPERIMENTAL GROUPS AND WITHIN THE SEPARATE GROUPS AT DIFFERENT PERIODS

		Means	Differences	Diff. / S. E. Diff.
Experimental group change from original to second marking period.	Mean (X1) Mean (X2)	—93.94 ± 11.20 —84.56 ± 7.63	9.38 ± 8.90	1.53
Experimental group change from second to third marking period.	Mean (X2) Mean (X3)	—84.56 ± 7.63 —48.44 ± 11.97	36.12 ± 10.48	3.45
Experimental group change from original to third marking period.	Mean (X1) Mean (X3)	—93.94 ± 11.20 —48.44 ± 11.97	45.50 ± 11.60	3.92
Control group change from original to third marking period.	Mean (C1) Mean (C3)	—82.31 ± 13.76 —88.06 ± 16.33	5.75 ± 11.98	0.48
Experimental group at the third marking period compared with the Control group at the original marking period.	Mean (X3) Mean (C1)	—48.44 ± 11.97 —82.31 ± 13.76	33.87 ± 18.22	1.85
Experimental group at the third marking period compared with the Control group at the second marking period.	Mean (X3) Mean (C2)	—48.44 ± 11.97 —89.44 ± 12.87	41.00 ± 17.55	2.33
Experimental group at the third marking period compared with the Control Group at the third marking period.	Mean (X3) Mean (C3)	—48.44 ± 11.97 —88.06 ± 16.33	39.62 ± 20.24	1.95

The comparisons of the Control and Experimental groups at any of the marking periods fail to show differences which are statistically significant. Thus, although the changes in the Experimental group are distinctly more favorable than those in the Control group, they are not beyond the limits of chance. Two factors contribute something to the lack of significance of these differences. The experiment was weighted against the Experimental group at the outset and the variability of the two groups was large. A larger number of cases might produce significant differences.

Twelve of the sixteen subjects involved in the Experimental Group made favorable progress during the investigation. Four did not. Of these, one pupil was experiencing serious social and home adjustment problems which have come to necessitate psychiatric treatment quite beyond the scope of ordinary guidance service. Her negative disparity increased markedly during the period of the investigation but doubtless in spite of the assistance given. A second pupil whose disparity increased slightly was experiencing home and social adjustment difficulties but also employed a particularly bad set of study habits which he could not change to a marked extent during the period of remedial treatment. A third pupil who showed slightly increased negative disparity during the period of the investigation experienced a serious conflict between his own interests and the ambitions of his parents

for him. A fourth pupil remained at the same disparity score throughout the period of the investigation. She was a passive sort of individual who appeared not to be stimulated or motivated by any attack that the case worker could devise.

All the pupils, including the four who failed to show favorable change, were co-operative and appeared pleased to have the assistance provided. In fact, case workers reported practically no difficulty in establishing rapport.

In addition to the statistical evidences presented, it was considered advisable to obtain from case workers, teachers and advisers their estimates of the problems confronting individual pupils and the extent to which some solution of these problems had been attained during the period of the experiment. The classification of the problems and changes is necessarily an arbitrary one and no one problem can be considered as existing wholly apart from other problems. Some problems could be detected through the use of objective measuring instruments, others could be discovered and described only through opinions of case workers, teachers, and advisers. Opinions as to the existence of problems and changes were not considered as reliable unless they were reported by at least two individuals directly observing the behavior of the individual pupils. The case workers, teachers, and advisers of pupils did, however, agree to a marked extent in their estimates of problems and changes.

Thirteen of the experimental pupils were found by the inventories to be lacking in breadth and intensity of interests. Seven of the 13 were reported as changing favorably in these respects during the experiment.

Adjustment inventories revealed that 10 pupils were experiencing some emotional distress. Some relief of this distress was reported for 4 pupils.

Fourteen of the 16 pupils depended upon improper study habits according to the inventory. Favorable changes were reported for 12 of these pupils.

Nine pupils were found to be suffering from some inability to make desirable social adjustments in their relationships with teachers, other pupils, and out-of-school associates. Favorable changes were reported for four of these pupils.

Three pupils were considered as deriving part of their academic difficulties from improper home adjustments. No change was reported for those pupils in that area.

Health difficulties troubled three of the 16 pupils. A favorable change occurred in only 1 of these cases; a case of visual defect, discovered by the case worker, referred to a physician, corrected by glasses. It may be noteworthy that the favorable change which might reasonably be expected in quality of school work as a result of this correction would probably fail to appear during the limited time between the final correction and the end of the experiment.

Four subjects were considered to be lacking in purposes; that is, in larger motives or goals, which, in the nature of drives, determine the intensity with which an individual applied himself to tasks at hand. In 2 of these cases favorable change was reported.

Five pupils were considered as lacking in motivation. This factor is probably not clearly distinct from either interests or purposes but does involve the added consideration of work done toward a goal which is not felt by the individual but which may be of some future value. Four of these pupils were considered as changing favorably in this respect.

One pupil presented the specific problem of adjustment to a new school situation quite different from the one last attended. A marked degree of favorable change was reported in her case.

Six pupils were considered as lacking in willingness to accept responsibility, to show initiative and dynamic persistence. Favorable change was reported for only 2 of these pupils.

Two pupils were considered as achieving poorly in academic work because of their own failure to set appropriate standards for their own work and a willingness to turn in work of an inferior quality. Both these pupils were reported as having changed favorably.

In the case of four pupils, a source of difficulty was found to be in an inability to see relationships, to connect present and past experiences, and relate materials being studied to interests. Although these factors are commonly associated with degree of mental ability, they did appear to occur among these pupils in spite of the fact that all those involved in the experiment were normal or above in intelligence. Whatever the source of the difficulty, no favorable change was reported.

Among these subjectively considered factors, study habits and breadth and intensity of interests were the most common sources of difficulty. Problems of social and emotional maladjustment were likewise frequent. Problems involving study habits and motivation were most frequently reported

to have changed favorably while problems arising from emotional adjustment, lack of acceptance of responsibility, and lack of ability to see relationships were least adequately cared for.

CONCLUSIONS

Analysis of the observations made in this investigation indicate certain conclusions and inferences.

1. The particular diagnostic and guidance services applied were effective in 12 of the 16 cases.

2. Positive changes in mean disparity occurred in the Experimental group during the course of the investigation while the changes in the comparable control group were slightly in the negative direction during the same period.

3. The differences between the Control and Experimental groups at the end of the investigation while not statistically significant, in terms of conventional standards did show a critical ratio of 1.95 in favor of the Experimental group.

4. The employment of diagnostic devices yielded important information concerning pupil difficulties in such terms that it facilitated the administration of guidance services.

5. The difficulties experienced by the pupils studied in this investigation were found to be distinctly different for different individuals and to be commonly multiple in character.

6. The pupils responded favorably to the guidance services and recognized the values derived.

7. Success in remediation was found to be more apparent with certain types of problems than others, especially those of an academic nature.

8. A high agreement was observed between the estimates of problems existing and of changes occurring in the subjects as made by case workers, and by regular teachers and advisers.

9. The case workers were of the opinion that their efforts had been valuable, even beyond the objective evidences of change, and felt that the experience had considerably enriched their own training experience.

COMPARISON OF ACHIEVEMENT OF PUPILS WHO ARE GOOD AND POOR IN LEARNING DIVISION WITH A TWO-FIGURE DIVISOR

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Editor's note: The comparative-causal method of investigation appears to find more frequent application to the every day problems of teaching and learning as more workers discover its possibilities. The author supplies a new application in a study of good and poor learners in arithmetic.

SUCH studies as those by Bond,[1] Fendrick, [2] and Russell[3] have shown the difference between pupils who are good and poor in some particular subject. There is no published report to indicate if there is any distinguishing difference between pupils who are good and poor in arithmetic. This study is an attempt to find if there is a quantitative difference between pupils who are good and poor in a certain restricted function in arithmetic. A group of each kind was selected on the basis of success in learning to divide with a two-figure divisor.

The measure of success in learning to divide with a two-figure divisor is the number of errors made. A pupil who learned the process and made no errors, or a very few, is considered good in division. On the other hand, a pupil who learned the process and made many different kinds of errors is considered poor in division.

The pupils considered in this study were used in another investigation by the writer.[4] A record was kept of the number of different kinds of errors which each pupil made from the time of the beginning of the investigation until its completion, or a total of 76 school days. Elsewhere the writer[5] showed that most of these errors were sporadic and not constant.

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[1] Bond, Guy L. *The Auditory and Speech Characteristics of Poor Readers*, Contributions to Education, No. 657 (New York: Bureau of Publications, Teachers College, Columbia University, 1935).

[2] Fendrick, Paul. *Visual Characteristics of Poor Readers*, Contributions to Education, No. 656 (New York: Bureau of Publications, Teachers College, Columbia University, 1935).

[3] Russell, David H. *Characteristics of Good and Poor Spellers*, Contributions to Education, No. 727 (New York: Bureau of Publications, Teachers College, Columbia University, 1937).

[4] Grossnickle, Foster E. "An Experiment with Two Methods of Estimation of the Quotient", *Elementary School Journal*, XXXVII (May, 1937), pp. 668–77.

[5] Grossnickle, Foster E. "Constancy of Error in Learning Division With a Two-Figure Divisor", *Journal of Educational Research*, XXXIII (November, 1939), pp. 189–96.

The range of the number of different kinds of errors made by any one pupil was from 0 to 18.[6] The pupils who made five or fewer errors while learning to divide with a two-figure number are in the good group; those who made twelve or more different kinds of errors are in the poor group. The number of pupils in each group is shown in Table I.

Table I shows that about half of the pupils in the good group did not make over three different kinds of errors in division while learning the process. About half of the pupils in the poor group made fourteen or more different kind of errors while learning the process. Clearly there is a pronounced difference between the structure of the two groups as far as ability with division by a two-figure divisor is concerned.

TABLE I

NUMBER OF DIFFERENT KINDS OF ERRORS MADE BY PUPILS IN EACH GROUP

Good Group		Poor Group	
Kinds of Different Errors	Number of Pupils	Kinds of Different Errors	Number of Pupils
0	11	12	16
1	5	13	8
2	3	14	7
3	5	15	5
4	6	16	5
5	17	17	3
		18	3
Total	47	Total	47

The difference between the two groups is measured in intelligence quotient, achievement in division, achievement in arithmetic during a five-year interval, and general academic achievement during a like interval. It was possible to make a study of most of the records of the pupils during a five-year interval because the original investigation dealing with the relative merits of the two methods of estimation of the quotient was made in the school year 1934–35. When possible, the academic record of each pupil was studied from that date until June, 1940. These pupils completed the fourth grade in June, 1935, and the ninth grade in June, 1940. Of course, many pupils moved to other communities, hence, a complete record cannot be given for the 47 subjects in each group.

The mean intelligence quotient for the good group found by the use of the National Intelligence Test, Scale A is 103.60 ± 1.94 and for the poor group, 102.27 ± 1.92. The mean difference between these two groups is very insignificant as it is less than 0.5 times its probable error. There-

[6] Grossnickle, Foster E. *Ibid*, p. 194.

fore there is no constitutional difference between the two groups as far as intelligence is a factor.

There were three different tests used in the division investigation to measure pupil progress in the process. These three tests were given at the following time intervals: Test I, at the end of 35 days of teaching; Test II, at the end of 53 days of teaching; Test III, at the end of 76 days of teaching.[7] The mean scores made by the two groups on these tests is shown in Table II.

TABLE II

MEAN SCORES MADE BY GOOD AND POOR GROUPS IN DIVISION IN GRADE IV

Test Number	Mean of Good Group	Mean of Poor Group	Difference in Favor of Good Group	Difference P. E. diff.
I	31.63 ± 0.642	28.54 ± 0.467	3.09 ± 0.694	4.45
II	29.48 ± 0.603	27.38 ± 0.718	2.10 ± 0.945	2.22
III	38.81 ± 0.735	37.19 ± 0.795	1.62 ± 1.17	1.50

Table II shows that on Test I the mean achievement in the good group is significantly greater than the mean achievement in the poor group. In the other two tests, there is only a chance difference between these two groups. It is noteworthy that the difference between the two means became smaller as the duration of the teaching period increased. Since drill plus analytical diagnoses of errors were the teaching procedures used in the investigation, the data in Table II show that these methods eventually produce satisfactory measurable results in computation.

The last measure of difference between the two groups is the mean achievement of each as shown by teachers' marks in academic subjects in different grades. An academic subject is considered as one which requires outside preparation and not mere group participation. The average record for each group is shown in arithmetic and for other academic records. The marks recorded were expressed in the conventional letters A, B, C, D, and F. The writer arbitrarily assigned the following numerical values to each letter: A = 95; B = 88; C = 82; D = 75; and F = 60. In the school center used, 75 is understood to be a passing grade of D. The average achievement made by each group in arithmetic (algebra or general mathematics in Grade IX) and in other academic subjects is shown in Table III.

Table III shows that there is a very pronounced difference in the average achievement in the two groups in arithmetic in the fourth grade.

[7] Grossnickle, Foster E. *Ibid.*, p. 671. (Footnote 4)

TABLE III

MEAN ACHIEVEMENT IN ARITHMETIC AND IN OTHER ACADEMIC SUBJECTS IN EACH GROUP IN GRADES IV–IX, INCLUSIVE

Grade	Good Group			Poor Group		
	Number of Pupils	Mean in Arithmetic	Mean in Other Academic Subjects	Number of Pupils	Mean in Arithmetic	Mean in Other Academic Subjects
IV	47	88.0	86.4	47	78.7	83.2
V	37	85.0	85.5	40	78.9	82.4
VII*	35	83.6	85.8	35	81.3	83.7
VIII	33	83.2	84.7	36	79.9	81.4
IX	32	82.1	82.1	35	82.5	82.1

* The record for Grade VI is missing because of the change in the marking system which went into effect in the school center used when these pupils reached the sixth grade. Marks in the elementary school are now expressed as satisfactory or unsatisfactory in this school center.

On the whole, as the pupils progressed through the grades, the mean differences in arithmetic between the two groups decreased. In fact, in the ninth grade the poor group had a slightly higher achievement than the good group. However, beyond the fifth grade, the mean accomplishment in arithmetic or in other academic subjects does not appear to be very great. It is to be remembered that the reliability of the means is affected by two factors, namely, small groups and teachers' marks. Therefore, small differences are not to be considered reliable. The data show trends.

The large difference in the means of the two groups in the fourth grade in arithmetic may be due to the teachers' tendency to base a mark on accuracy. The work in division constituted the basic subject matter for the grade. Since it was shown that the pupils in the poor group made many different kinds of errors in learning division, the teachers' marks may have been unduly influenced by that factor.

On the whole, Table III shows that there is not much difference in the achievement of the two groups except in arithmetic in Grades IV and V. It was shown that at the end of the experiment in division the two groups had about the same achievement in the process. Therefore, poor achievement in a particular subject can be overcome when proper teaching precautions with adequate practice materials are applied. This conclusion seems to agree with the findings by Bond when he compared the achievements of good and poor readers in the second and third grades. He stated as follows: "The conclusion may, therefore, be drawn from the accumulating evidence, that when the situation, including the method of instruction, is favorable to the sensory limitations of the pupil, he may be expected to

have little difficulty with reading. If, however, the instruction is not adjusted to the pupil's limitations, he may encounter extreme difficulty or complete failure in his reading development".[8]

The data in Table I show that there was no constitutional difference between the two groups. Each group was subjected to the same teaching program. The final achievement in each group in division was about the same, but yet the good group learned the process much more readily than the other. The data do not indicate if the good group had better insight and understanding of the process than the poor group had. It may be that the final achievement of the two groups was about the same when the poor group developed insight into the meaning of division. On the other hand, the satisfactory achievement of this group may have resulted from the use of effective practice materials and analytical diagnoses of errors. At any rate it can be stated that there is not a significant difference in achievement in arithmetic and in other academic subjects between a group which makes many different kinds of errors and a group which makes very few kinds of errors in learning to divide when the divisor is a two-figure number.

SUMMARY

This study was made to find if there is a quantitative difference between groups of pupils who are good and poor in division when the divisor is a two-figure number. A pupil is considered good or poor in division according to the number of different kinds of errors which he makes in learning the process. The two groups were compared in intelligence quotients, in success in division, and in achievement in arithmetic and in other academic subjects over a five-year period. The results are as follows:

1. There is no constitutional difference between the two groups. There is only a slight chance difference in the mean intelligence quotient of each group.

2. The achievement in division when the divisor is a two-figure number was measured at the end of 35 days of teaching, 53 days of teaching, and 76 days of teaching. On the first test, there was a significant difference in the means in favor of the good group. On the other two tests there was only a chance difference between the means in favor of the good group.

[8] Bond, Guy L. *Ibid.*, p. 44.

Since drill and analytical diagnoses were the chief instructional instruments, these were effective in producing computational efficiency.

3. The mean achievement in arithmetic as measured by teachers' marks in the fourth and fifth grades is considerably higher in the good group than in the poor group. However, in Grades VII, VIII, and IX, the achievement of the two groups is about the same.

4. The mean achievement as measured by teachers' marks in other academic subjects over a five-year interval in the two groups is about the same.

The data in this study show that there is no quantitative difference between the structure of the two groups. They have the same basis of native ability, and their achievement eventually is the same. The poor group requires slightly more time to make the proper adjustments for success in a subject.

The effectiveness of drill with the correct kinds of practice materials plus analytical diagnoses of errors cannot be challenged for achievement in division. The reader should remember that no attempt has been made to show the effectiveness of these methods in showing growth in insight and quantitative judgment. However, the data indicate very clearly that a pupil who is given the proper kind of practice materials in arithmetic will succeed in that process. This study gives no indication of the relative effectiveness of teaching division by drill and by the development of meaning and insight. The latter may be very much more effective than the former, but this study shows that the drill program with correct practice materials and correct analytical diagnoses is effective in producing measurable results in division.

AN ANALYSIS OF AVERAGES INVOLVED IN BROKEN TRENDS IN THE CROSS-TABULATION PROCESS

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Editor's note: The practice of transporting rural pupils has grown tremendously during the last decade or so. The author offers a new statistical technique for the study of school costs in this area.

WITHIN the last decade educational researchers and researchers in other fields have employed cross-tabulation rather than the correlation analyses. Professor Stanley W. Warren[1] of the College of Agriculture of Cornell University gave a number of examples in which the cross-tabulation process showed no greater significant error than the correlation process and brought out more facts included in the data. Noble[2] used this process in the analysis of six factors involved in pupil transportation costs in North Carolina. Roberts[3] also used the cross-tabulation process in the analysis of school transportation costs in Arkansas. These and other successful application of cross-tabulation encouraged the writer to give it preference in his effort to analyze certain factors affecting the cost of transportation in the central rural schools of New York State.

Data were collected from sixty of the 213 central rural districts existing in January, 1938, and were for the school year 1936–37. Final analysis was made of data for 207 district owned buses of twenty or over passenger capacity from forty-three districts. Factors were eliminated where possible through examination of the data and investigation through other channels. After all possible eliminations had been made through other channels, there remained twenty-four factors to be cross-tabulated. One by one these factors were used as the criterion for the comparison of various units of cost. The criterion was broken down into brackets and various time, pupil and vehicle

[1] Warren, Stanley W. *Multiple Correlation Analysis as Applied to Farm Management Research, Memoir No. 141* (Ithaca, N. Y.: Cornell University, Agricultural Experiment Station, 1932).

[2] Noble, M. C. S. Jr. *Public School Transportation in North Carolina* (Raleigh: State Department of Education, 1932).

[3] Roberts, Roy W. *Estimating the Cost of Pupil Transportation in Arkansas*, Thesis for Ph.D. Degree, Cornell University (1934).

units of cost were used in making the comparisons. Data for each of the 207 buses were placed on separate cards and the sorting was done by hand since there were so few cases.

Factors involved in the cross-tabulations were:

A. *Factors Relating to Buses and Routes:*
1. Seating capacity of bus
2. Pupils hauled per bus per day
3. Average number hauled per bus per trip
4. Annual distance traveled per vehicle
5. Length of bus routes one way
6. Original cost of vehicle (depreciation)
7. Annual cost of current operation
8. Times vehicle stops per day or per trip
9. Make of vehicle
10. Ownership of vehicle
11. Number of days bus is operated per year
12. Age of vehicle

B. *Factors Relating to Management:*
1. Wages of drivers
2. Ages of drivers employed
3. Wholesale or retail purchase of supplies or equipment
4. Service and maintenance plan
5. Location of bus storage garages
6. Buses housed in heated or unheated garage

C. *Factors Relating to the School District:*
1. Area of the district
2. Density of pupil population
3. Number of years district has provided school transportation
4. Annual school district budget
5. Distance of the school from a large center of population

D. *Factors Relating to Highways:*
1. Mean annual snowfall

When costs were cross-tabulated with these criteria, in some cases no trends were discernible while in other cases there were constant tendencies for the units of cost to rise or fall directly or inversely with the criterion. In some cases the trend would be general but for a specific bracket the trend would be broken. These breaks in trend caused the writer to try to analyze the cause for the inconsistency in trends by analyzing the averages involved in the cross-tabulation process.

Before an effort was made to analyze the averages involved in the cross tabulations in which trends had not been consistent, it had become evident that the two most potent factors involved in school transportation costs were miles traveled per bus per day and the number of pupils transported per bus per day. A regression table was set up for predicting cost of transportation, and comparison of costs obtained from this table for buses lying in brackets showing discrepancies in trend were made with the costs shown for these buses in the brackets involved.

The following equation was obtained in a regression of miles traveled per bus per day and pupils hauled per bus per day upon total cost of operation per bus per day:

$$\bar{X}_1 = .017x_2 + .026x_3 + 7.13$$

In this formula predicted $\bar{X}_1$ represents the cost per day in dollars based on "x_2", the miles traveled per bus per day and "x_3", the number of pupils hauled per bus per day. The equation shows that starting with a constant of \$7.13 per bus per day, the addition of each ten miles calls for \$.17 additional cost while each additional ten pupils calls for \$.26 additional cost. A bus traveling ten miles and hauling ten pupils per day would cost:

Constant	\$7.13
10 pupils	.26
10 miles	.17
Total	\$7.56

However, this cost figure of \$7.56 was subject to a standard error of estimate of $\pm$ \$1.94, indicating that 68 times out of 100 the cost of operating a bus ten miles and carrying 10 pupils per day would lie within a cost range of \$5.62 and \$9.50 per day. This same method from the regression table was used for predicting cost for buses running other distances and hauling various numbers of pupils.

The following indicates the method of attack in attempting to analyze averages involved in the tables where broken trends are shown in cross tabulations:

Relation of Seating Capacity of Bus to Cost: Table I indicates the relation of seating capacity of bus to cost.

TABLE I

RELATION OF SEATING CAPACITY OF BUS TO COST OF TRANSPORTATION, 207 DISTRICT-OWNED BUSES

Seating Capacity	No. of Buses	Pupils hauled Per Day	Cost Per Bus			Cost Per Pupil		Cost Per Seat-Mi.
			Per Year	Per Day	Per Mile	Per Day	Per Mile	
10–19	1	35.0	1483	7.41	.3326	.2118	.0190	.0185
20–29	11	31.9	1356	7.20	.2936	.2257	.0132	.0108
30–39	69	30.4	1446	7.82	.2307	.1862	.0085	.0068
40–49	79	54.3	1706	9.22	.2480	.1697	.0070	.0054
50–59	22	56.3	1972	10.70	.3568	.1901	.0079	.0062
60–69	21	75.7	1935	10.43	.2695	.1739	.0063	.0045
70–79	3	51.6	2298	12.47	.4262	.2166	.0074	.0061
80–89	1	64.0	2344	12.53	.4178	.1959	.0065	.0049
Total	207	49.0	1663	8.98	.2582	.1800	.0077	.0061

The cost per bus per year and per day increased as the seating capacity increased. The significant range in annual cost was from $1356 to $1935, and the range in cost per bus per day was from $7.20 for buses seating 20 to 29 pupils to $10.43 for buses seating 60 to 69 pupils. Because of the fewness of cases in the first and in the last two brackets, they are not included in the range as significant. The cost per pupil per day ranges downward from $.2257 in the "20–29" bracket to $.1729 in the "60–69" bracket. Pupil-mile and seat-mile costs showed generally a downward trend, although not a consistent one, as the size of the bus increased. The pupil-mile cost range for the significant groups was from $.0132 to $.0063 and the seat-mile cost range was from $.0108 to $.0045.

Analysis of Partial Data from Table 1. Table 1 shows breaks in the trend for the daily cost of bus operation to rise as the seating capacity of the buses increase in the "20–29", "60–69", and "80–89" brackets. Some of the brackets also show downward trends in bus-mile, pupil-time, pupil-mile, and seat-mile units of cost as the seating capacities of the buses increase.

Table 2 is compiled to show how the relative service performed and the cost of operation of buses in certain seating-capacity brackets, from Table 1, compare in service and cost of operation with the average for the 207 district-owned buses included in this study.

Further examination of data relating to cost of operating buses in the included brackets is made in Table 3.

A glance at Table 2 shows the variations in daily cost of bus operation in Table 1, may, in most but not in all cases, be attributed to bus miles

TABLE II

COST PER BUS PER DAY AS COMPUTED FROM THE REGRESSION TABLE TO NEAREST 5 PUPILS OR 5 MILES, AND ALSO AS SHOWN IN TABLE I FOR CERTAIN BUS-SEATING-CAPACITY BRACKETS, AND FOR THE AVERAGE FOR ALL BUSES

Brackets From Table 1	Average Days Buses Operated	Bus Miles Per Day	Pupils Per Bus Per Day	Cost Per Bus Per Day	
				Regression Table	Table 1
Average	184.1	34.1	49.0	8.89	8.98
20–29	188.3	24.5	31.9	8.34	7.20
60–69	185.6	38.7	75.7	9.76	10.43
70–79	184.3	29.9	51.6	8.76	12.47
80–89	187.0	30.0	64.0	9.02	12.53

TABLE III

AVERAGE AGES AND DAILY COSTS FOR BUSES IN CERTAIN BRACKETS RELATING TO SEATING CAPACITY OF BUSES IN TABLE I, WITH COMPARATIVE FIGURES FOR THE AVERAGES FOR ALL BUSES INCLUDED IN THIS STUDY

Item	Average	"20–29"	"60–69"	"70–79"	"80–89"
Age of buses years	4.4	5.0	3.8	5.7	5.1
Drivers' daily wages	3.19	3.11	3.17	3.35	4.55
Depreciation	2.87	1.68	3.10	4.49	4.06
Gasoline	.76	.39	.89	.75	1.34
Repairs	.70	.76	.54	1.77	.12
Insurance	.65	.50	.71	.83	.54
All others	.81	.76	2.02	1.28	1.92

traveled per day and number of pupils hauled per day, since the estimates from the Regression Table are subject to a Standard Error of Estimate of 1.94. The exceptions are in the "70–79" and "80–89" brackets.

Examination of Table 3, however, shows that much is covered up in cost estimates based on averages. The low daily cost of operating buses seating from twenty to twenty-nine persons is due to the inexpensive type of equipment used, coupled with the type of service rendered. The drop in cost of daily operation for buses in the "60–69" bracket is due to the fact that many of the buses are new and the maintenance and operation costs are low for the year. Only one bus is included in the "80–89" bracket and it was apparently in good repair at the beginning of the year. The "70–79" bracket showed a resumption of the upward trend in daily cost as the seating capacities of the buses increased.

While the bus-mile cost tends to vary inversely with number of bus-miles traveled in Table 1, the variation is not proportional. Bus-mile cost varies directly with the ages of the buses. There are perhaps other factors such as the number of stops made per bus per mile, and road conditions, affecting these costs for individual buses, for which adequate data were not available in making this study. Cost per pupil per day varies directly but not proportionately with bus-miles traveled, in Table 1; the per pupil cost is also greatly affected by the number of pupils hauled. Pupil-miles rather than pupils or miles determine the per pupil cost.

Other tables where broken trends were shown were analyzed and any number of underlying causes for such breaks were found to be operating other than the criterion used as the basis for comparison.

It is well for research workers to recognize that in applying the cross tabulation process there is a reason for a broken trend in the correlation of the unit of comparison with the criterion. The careful student will attempt to show the cause for such breaks in trend.

EDITORIAL

ON THE USE OF ANECDOTAL RECORDS

OF THE newer devices employed in collecting and recording data one finds frequent reference in recent educational literature to anecdotal records.[1] Many workers have made use of this device and it serves an important original and supplementary function. One of the fields in which this device has had wide use is that of the supervision of classroom instruction[2] in which it has been subjected to critical examination from many points of view. With this work as a background the writer would like to suggest certain problems that may arise in the use of such data in formal and informal problem solving.

First of all, except in those fairly rare cases wherein complete records of total behavior may be had, there is the problem of sampling. In the absence of complete records one usually resorts to some sort of short time samples. How long a time interval should one use? How many such samples shall one take? How reliable are such data? An even more distressing question arising out of the use of such records is the question "what shall one record?" Naturally the nature of the search or problem will determine the general character of what one records. If one merely records, however, those things which impress one personally as important, then the data are likely to be quite subjective, the subjectivity varying according to the nature of the thing studied and the personal idiosyncracies of the observer.[3] Of the elements present in any given situation under consideration, all are not of equal importance, relevance or potency. How shall one choose? In more formal methods of research the aspects of the situation to be investigated normally receive careful consideration, each investigator being guided at least in part by previous investigations in the area under investigation.

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[1] Jarvie, L. L. and Ellingson, Mark. *A Handbook on the Anecdotal Behavior Journal* (Chicago: University of Chicago Press, 1940), pp. 71.

[2] Barr, A. S. *An Introduction to the Scientific Study of Supervision,* (New York: D. Appleton Co., 1931), pp. 399.

[3] Ibid, pp. 199 ff.

Having decided upon what information to collect how shall one collect the information? There are many devices that one may use for this purpose: tests, questionnaires, interviews, observation, etc. Does the device employed secure the data that it purports to secure? In every case there is a problem of validity. Interviews and questionnaires are just as much subject to validation as tests and other objective devices. Closely associated with the problem of collecting valid, reliable and pertinent data is the problem of records. Conventionally the anecdotal record is a mixture of observed objects, impressions, and inferences. No objection is raised to the recording of impressions and tentative generalizations but the critical student will prefer to see also the data from which the generalizations were drawn. The best anecdotal records clearly distinguish between fact and inference.

A second large group of problems arises in the interpretation of the data collected. Suppose that one has at hand a number of objectively recorded short time samples of teaching, learning, group activity, etc., how may one reach valid judgments about the appropriateness, value, and efficiency of the acts and conditions observed. It would seem that the appropriateness of an act in the realm of human activity might depend at least in part upon the persons, purposes and conditions that give rise to it. If so, how does one get from the known facts in the situation to a judgment about acts? In part, one's judgments about the appropriateness of human acts arise from recognized agreements and non-agreements with the generalizations of science, philosophy and personal experience that one holds to be true. What constitutes agreement and non-agreement between acts and generalizations? How does one get from acts to principles and principles back? A third criterion of appropriateness, and for many the ultimate criterion, is that of effect, consequences, or results. If so, how shall one determine effects and the relation of particular acts to effects? Many workers have not considered probably as carefully as they should, the processes by which judgments in education are reached. Nothing has been said here about the processes by which one reaches judgments about the skill with which acts are performed.

Finally, the anecdotal record provides an interesting problem in the realm of generalization for those who wish to proceed from individual analysis, diagnosis and treatment to the characteristics of groups of individuals. Naturally comparable data must be collected if such generalizations are to be formulated, but this is more difficult to do than it may at

first sight seem. Are acts and qualities that go by the same name comparable units? One may count, add, multiply, divide and subtract the units of each but are the things of which these units are composed comparable? Each measured or observed value is merely a part of a larger pattern. May not the content of a unit of measurement vary with the pattern of which is a part? There may be substitute acts and qualities and compensation. If so, how shall one keep track of the individual potencies of these units from pattern to pattern in subsequent treatments of the data?

The anecdotal record is a valuable guidance and research technique. The purpose of this editorial has not been to question its value but rather to review some of the more obvious problems of interpretation arising from its use. The difficulties recited are not in the judgment of the writer insurmountable.

A. S. BARR.

CURRENT NEEDS IN EDUCATIONAL RESEARCH

MAN is the only creature under heaven who is capable of studying his present conditions and achievements for the purpose of improving them. That is one field in which humanity is sure to excel since there is no competition. One might go so far as to maintain that such study or research, as it is now called, is a unique human function. No one doubts that human life and achievement needs improving nor is there any question about who must do it if it is done. Upon these two fixed points it is possible to establish a fruitful approach to a discussion of what we now need most in educational research.

The great leaders in the study of medicine have based their program on a foundation such as the one just indicated and their success has challenged the attention of mankind throughout the world. Twenty years ago educational leaders started on a similar program. We now hear much of educational diagnosis and treatment and some attention is being devoted to prevention. But the knowledge of how to prevent seems to grow only out of studies of methods of treatment.

A complete educational research program would involve complete diagnosis as a prerequisite. We must find out what is the matter with the world and invent names for its various diseases. Such a program would be

the task of generations but it is at least a fruitful approach and we of this generation must continue the beginning that has been made in the past twenty years. The purpose of this editorial is to point out some of the problems which seem to face us in the near future. It is written from the point of view of one who is called upon to deal day by day with certain problems which beset us as educators and who is impressed with the urgency of human needs everywhere.

We are at last beginning to realize that there is an organic completeness about human life. We have erred here to fore on the side of a too intense specialization. As research workers we prided ourselves on our ability to concentrate our attention upon the narrow problem in hand. We considered it a virtue to be able to shut our minds against the woes of a suffering world. That was a mistake. While we were digging in one corner of our little garden, democracy, instead of being safe, was almost destroyed. While we were investigating the problems of reading, arithmetic and spelling, our whole way of life was and is seriously threatened. Now we begin to understand that human beings and the world as a whole are organismic in character. We can not study one part profitably without keeping our eye on the rest. A realization of that fact is sure to revolutionalize educational research. The beginning of that revolution is now in sight. Let us take a look at a few of its phases.

In spite of a generation of educational research and several generations of other kinds, the culture lag is still with us. A century ago a poet sang of a time "when war drums shall throb no longer" and when we shall have "argosies of purple twilight". After nearly one hundred years we have the airplanes but the war drums are throbbing louder than ever. Why is this and what can we do about it? Much has been written about the problem. We have diagnosed the difficulty fairly well but only recently has any one suggested a remedy. We have made much progress since the days of the ancient Greeks in almost every phase of life. But in one area which may easily prove to be the most important of all we are still at the place where Aristotle left us. While tremendous advancement has been made in medicine, music, mathematics, physics and chemistry, our logic is just about what it was nearly three thousand years ago. Surely research studies are needed in this area. Korzybski suggests that the main trouble lies in the fact that we have an inadequate vocabulary. In ideal vocabulary each word would be a

symbol for something which actually exists in the world including ourselves. This requirement has been violated in at least four ways. (1) Some concepts are represented by more than one word, (2) some words represent a number of concepts, (3) some words do not represent real concepts at all and (4) some words purport to stand for one concept but in reality stand for another. Korzybski believes that one or more of these defects is responsible to a large extent for the social lag. His theory may be wrong but it is surely worthy of investigation. Drowning men grasp at mere straws.

If the principle of the "organism-as-a-whole" is true it is not lawful to divide the human personality into intellect and emotion. If we make such a classification we are using two words to represent one concept. Our basis of classification is false and genuine science, which is classified knowledge, can not be based upon fictitious classifications. Korzybski asserts that genuine progress has come only in those subjects which have discarded the old language and have adopted a system of technical terms, each of which avoids the four defects which have been mentioned. He thinks that therein lies the main reason for their progress.

In Social Science, including education, we have no such vocabulary. The very name Social Science fits English much better than the mixed areas to which it is now applied. The whole subject as now organized is full of words which suffer from one or more of the four defects. The same holds true for the daily vocabulary of the common man. This being true, clear thinking is out of the question. Misunderstandings, quarrels and wars are unavoidable. Progress is impossible.

Such accusations are far too important to be ignored. If the problem lies in the field of vocabulary its solution seems to belong to the educational research worker. Furthermore as long as the accusation stands whole areas of our past research findings are in danger. For example some of our most respectable research is that relating to the learning process in which it has been assumed that human beings learn as animals learn. This involves the more or less tacit assumption that man is an animal in that respect. Is he? Or are we making the error listed above as number four?

In organismic procedure relationships far outweigh mere facts. The relationship of words to the concepts back of them is a legitimate part of organismic procedure. Any educational procedure which consciously or unconsciously splits a human being into intellect and emotion is likely to

prove unsound. Correlation coefficients for years have been warning us that something is wrong with our assumptions. The large amount of alienation has been a continual source of embarrassment. Has the trouble been in the logic of our underlying assumptions? May not the emotions and attitudes of the children involved have had something to do with the scores on our controlled experiments? May not the failure of remedial procedures have been due primarily to lack of morale on the part of the pupil? Can fear paralyze intelligence and thereby stigmatize some person as a "low I. Q."? To what extent is poor spelling due to the child's inability to hear sounds of some special frequency? To what extent is pupil misbehavior related to failure to achieve self respect and self realization? How much of our poor work in school is due to the effect of the child's environment? How can we talk about experimentation under controlled conditions when nothing is reported concerning the affective states of our subjects?

Questions like these sooner or later will cause a revolution in educational research. They will necessitate a careful revision of all or most of the findings that we already have and they will lead to better types of work hereafter. In the mean time it will be hard on all of us. We thought we had some things settled and were just preparing to lie back in our easy chairs and contemplate with pride our contributions to human learning.

A realization that our program is incomplete will be disappointing. To meet that disappointment we shall need all of our scientific training. If it has been genuine we are already aware of the fact that new ideas are often painful. We shall also know that we must not ignore the results of keener insight and that we dare not ignore the urgent needs of a distracted world. If we can realize all of this our hopes for a better world will not be in vain.

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Research Abstracts and Bibliographies

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

ARONOFF, FANNE, CONVERS, GILBERT and HODGES, NORA. *A Guide to Materials for Teaching English to Refugees* (New York: Committee for Refugee Education, 1940), 36 pp.

The authors present an annotated bibliography of some 500 titles on the teaching of English to refugees.

DOLL, EDGAR A. "Annotated Bibliography on the Vineland Social Maturity Scale," reprinted from the *Journal of Consulting Psychology*, IV (July–August, 1940), pp. 123–132.

Lists 66 titles with a brief abstract of each.

DWYER, P. S., HORNER, CHARLOTTE, and YOAKUM, C. S. *A Statistical Summary of the Records of Students Entering the University of Michigan as Freshmen in the decade 1927–1936*, University of Michigan Administrative Studies, I, No. 4 (Ypsilanti, Michigan: University Lithoprinters, 1940), 226 pp.

A statistical study of the predictive value of tests and other facts about entering freshmen at the University of Michigan.

HOLY, T. C., and WENGER, ROY. *The Disposition of School Bond Issues and Special Levies Submitted in Ohio School Districts Between January 1 and November 5, 1940, Inclusive* (Columbus, Ohio: Bureau of Educational Research, Ohio State University, December, 1940), 22 pp. Mimeographed.

The authors present a statistical analysis of the disposition of city and county school bond and special levies in Ohio school districts.

LANDY, EDWARD, and OTHERS. *Occupational Adjustment and the School*, Bulletin of the National Association of Secondary-School Principals, XXIV, No. 93 (Washington, D. C.: National Association of Secondary-School Principals, November, 1940), 160 pp.

The authors present the results of a study of the occupational adjustment of youth upon leaving school with the purpose of devising forms and research techniques generally useful in making such studies.

NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. *What People Think about Youth and Education*, Research Bulletin, XVIII, No. 5 (Washington, D. C.: National Education Association, November, 1940), pp. 187–219.

This bulletin contains a report of lay opinion toward youth and education as compiled by the Institute of Public Opinion.

NORTHWEST REGIONAL COUNCIL. *Pacific Northwest Problems and Materials: An Introduction,* Know Your Northwest Series (Portland, Oregon: Northwest Regional Council, October, 1940), 190 pp.

A regional survey to provide accurate information on the social, economic, and governmental problems of the region.

PALMER, EMILY G. *Occupational Trends in California with Implications of Vocational Education: VII. Trends in Counties and Cities,* Bulletin of the California State Department of Education, IX, No. 3 (Sacramento, California: California State Department of Education, October, 1940), 161 pp.

Contains vocational and community information for persons responsible for providing vocational education.

REAVIS, WILLIAM C., Editor. *Evaluating the Work of the School,* Proceedings of the Ninth Annual Conference for Administrative Officers of Public and Private Schools, III (Chicago: University of Chicago Press, 1940), 236 pp.

This bulletin contains a series of papers presented at the ninth annual meeting of administrative officers held at the University of Chicago. These papers relate to the nature and purposes of systematic evaluations, the evaluation of instructional services, the evaluation of administrative and supervisory services, the evaluation of the socializing functions of the modern school, and formulating a comprehensive program of evaluation for a school year.

The Research Quarterly of the American Association for Health, Physical Education, and Recreation, XI (October, 1940), pp. 1–160.

The Quarterly contains a number of articles on research in health, physical education and recreation: short cuts in working out intercorrelations, chest-height-weight tables for college women, achievement tests in field hockey, etc.

RUSSELL, JOHN DALE, and OTHERS. *Organization and Administration of Education,* Review of Educational Research, X, No. 4 (Washington, D. C.: American Educational Research Association, October, 1940), pp. 299–402.

This issue of the Review contains a summary of researches relating to general organization problems, the organization of education at various levels, the administration of school systems, administration of higher education, and the administration of special education services.

SMITH, HENRY LESTER, and EATON, MERRILL T. *The Teaching of Arithmetic to Low-Ability Students in the Elementary Schools,* Bulletin of the School of Education Indiana University, XVI, No. 6 (Bloomington, Indiana: Bureau of Cooperative Research, Indiana University, November, 1940), 130 pp.

Contains a summary of literature relating to the teaching of arithmetic to low-ability pupils in the elementary school.

CURRICULA AND OBJECTIVES

HIRSH, JOSEPH, and PRITCHARD, ELIZABETH G. "Teaching of Social Medicine in Liberal Arts Colleges and Universi-

ties," *Public Health Reports*, LV, No. 45 (Washington, D. C.: United States Public Health Service, November 8, 1940), pp. 2041–2060.

The authors present a survey of the current status of the teaching of social medicine in liberal arts colleges with data on prevalence, content of courses, etc.

PUPIL GUIDANCE, WELFARE AND DEVELOPMENT

LOVE, L. L., and MCCABE, J. E. "Evaluation of a Faculty Advisory Program for Freshmen," *Educational Research Bulletin*, XIX, No. 17 (Columbus, Ohio: College of Education, Ohio State University, November 20, 1940), pp. 483–488.

The authors present the results of a questionnaire study of the reaction of students to the Ohio State University faculty advisory program for freshmen.

SPRINGSTEEN, THELMA. "A Wyoming State Training School Survey of Emotional Stability, Intelligence, and Academic Achievement," *Journal of Exceptional Children*, VII, No. 2 (November, 1940), pp. 54–64.

The author presents a summary of a number of measures of intelligence, emotional stability, and achievement for the Wyoming State Training School.

NEW TESTS

BAKER, HARRY J., and VOELKER, PAUL H. *Detroit Clerical Aptitudes Examination* (Bloomington, Illinois: Public School Publishing Company, 1940).

This examination consists of the clerical aptitudes sections of the Detroit General Aptitudes Examination, and measures: rate and quality of handwriting, rate and accuracy in checking, knowledge of simple arithmetic, motor speed and accuracy, knowledge of simple commercial terms, visual imagery, rate and accuracy in classification, and alphabetical filing.

BAKER, HARRY J., VOELKER, PAUL H., and CROCKETT, ALEX. C. *Detroit General Aptitudes Examination*, Form A (Bloomington, Illinois: Public School Publishing Company, 1940), 16 pp.

Contains ten tests of intelligence, nine tests of mechanical aptitude, and nine tests of clerical aptitude to be used in educational counseling.

BAKER, HARRY J., VOELKER, PAUL H., and CROCKETT, ALEX. C. *Detroit Mechanical Aptitudes Examination*, New Edition (Bloomington, Illinois: Public School Publishing Company, 1940).

This examination consists of the mechanical aptitudes section of the Detroit General Aptitudes Examination and measures: simple arithmetic, motor speed and precision, tool recognition, visual imagery, mechanical sizes, mechanical information, rate and accuracy in classification, and imagery for direction and speed of pulleys.

Dunlap Academic Preference Blank (Yonkers-on-Hudson, N. Y.: World Book Company, 1940).

A ten minute test for grades 7 to 9, for estimating: an individual's preference for school subjects, probable success in eight subject-matter areas and in general achievement, mental ability and intellectual alertness.

Research News and Communications

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

DOCTORS' THESES UNDER WAY IN EDUCATION, 1940–1941

CARTER V. GOOD
University of Cincinnati

This is the eleventh annual list of Doctors' theses under way in education to be published in the January number of the *Journal of Educational Research*. The present list includes only the titles which have not been printed in the January, 1938, 1939, and 1940 numbers of the *Journal*. Therefore, in order to make a reasonably complete canvass of doctoral studies under way at present, it is necessary to examine these four lists, 1938–41.

Completed dissertations may be discovered through canvassing the annual bibliographies of research in education, published by the United States Office of Education, and through *Doctoral Dissertations Accepted by American Universities*, published annually by the H. W. Wilson Company.

In all cases the name of the student, thesis title, and graduate institution are given, and in most instances the major adviser or advisory committee is listed. No differentiation is made in this compilation between Ph.D. and Ed.D. problems.

The institutions which have sent titles for inclusion in the 1940–41 list are: Boston, Bryn Mawr, Buffalo, California, Catholic University, Chicago, Cincinnati, Colorado, Colorado State College of Education, Columbia, Cornell, Duke, Fordham, George Washington, Harvard, Indiana, Iowa, Johns Hopkins, Kansas, Kentucky, Loyola, Michigan, Minnesota, Missouri, Nebraska, New York, Northwestern, Ohio, Oklahoma, Oregon, Peabody, Pennsylvania, Pennsylvania State, Pittsburgh, Southern California, Stanford, Syracuse, Temple, Texas, Virginia, Washington (Seattle), Western Reserve, Wisconsin, and Yale.

In the topical index, an effort has been made to classify each title under one or more headings; for example, "The Development of Industrial Education in Pennsylvania" is indexed under both "history of education" and "industrial education." The numeral in the index refers to the corresponding number in the alphabetical list of doctoral candidates.

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1. Abernathy, Ruth. "A Study of the Cost of Physical Education Programs in Selected High Schools in New York State." Columbia. Williams, Norton.
2. Abney, Velma O. "An Analysis of the Mechanics of English Required in Stenographic Occupations." Southern California. Blackstone.
3. Afros, Jacob L. "The Effects of Educational-Vocational Guidance in the New York City Junior High Schools upon Truancy and Delinquency." New York. Brown.

4. Ahern, Alvin A. "William Ernest Hocking's Philosophy of Religion." New York. Horne.
5. Aiosa, Anthony. "Factors Associated with the Adjustment of Delinquent Boys." Johns Hopkins. Bamberger.
6. Albert, Harold. "An Analysis of Teacher Rating by Pupils in San Antonio, Texas." Stanford. Almack.
7. Ale, Ida Greeley. "An Experiment in Children's Reading: Classroom and Individual Tests in Logical Reading." New York. Radosavljevich.
8. Alexander, Fred M. "An Interpretation and Appraisal of State Curriculum Programs." Columbia. Hopkins.
9. Allen, Myron S. "Community Aid in Meeting Guidance Needs of Junior College Students." Southern California. Lefever.
10. Altman, Clara. "The Objectives of Modern Foreign Languages and Their Bearing on the Curriculum of Secondary Schools in Nebraska." Nebraska. Rosenlof.
11. Altus, William. "The Relationship between Certain Objective Measures and Achievement in First-Year College English." New York. Benson.
12. Anderson, Robert E. "A Study of Vocational Education in Oregon." Oregon.
13. Arey, Charles K. "An Investigation of the Expressions and Proposals in Science of Certain Elementary School Children." Columbia. Craig.
14. Armstrong, Watson. "A Procedure for Setting up a Program of Instruction for Out-of-School Young Men on Farms." Kentucky.
15. Arnold, Henry Frederick. "An Investigation of the Comparative Effectiveness of Certain Study Techniques on History Achievement among College Students." New York. Creager.
16. Aseltine, John. "High School Experiences and Later Life Adjustment of High School Drop-Outs." Southern California. Weersing.
17. Ashbrook, William D. "The Development of Industrial Education in Pennsylvania." Pittsburgh. Nietz.
18. Bailey, Flora L. "What Are the Beliefs as Practiced by the Navaho Indians Pertaining to the Reproductive Cycle?" New York. Lloyd.
19. Baitzer, Sister Mary Loyola. "A Curricular Study in High School Religion Based on the Minimum Essentials." Loyola. Schmidt.
20. Barall, Milton. "The Contributions of Emilie Blais De Sauze to the Teaching of Modern Foreign Languages." New York. Olinger.
21. Barber, Anson B. "Regional Plans for Vocational Business Training." Harvard.
22. Barber, Joseph E. "An Evaluation of the Guidance System of the East Aurora (New York) High School." Buffalo. Jones.
23. Barber, Lucille. "Pre-Service Training of Teachers for One-Room Rural Schools." Syracuse. Melchior.

24. Barnard, Anne Hawkins. "The Use of Selected Motion Pictures and Associated Discussions as Related to Evidence of Change in Social Attitudes of Adult Women." New York. Long.
25. Barnes, Jean. "Clement L. Vallandigham, Copperhead." Minnesota. Williamson.
26. Bartelt, Allan D. "The Development and Evaluation of an Integrated Visual Aids Program in General Science in the Secondary Schools." Wisconsin. Torgerson.
27. Bates, H. S. "A Community and Youth Survey as a Basis for Reorganization of the Secondary Program." Cincinnati. Good.
28. Beard, Lela. "Teaching Speech in Secondary Schools." Oklahoma. Ortman.
29. Beck, Hubert Park. "The Social Composition and Social Ideas of Boards of Trustees of American Universities." Columbia. Counts.
30. Beebe, Ruth White. "A Psychological Study of the Climacteric in Fifty Women." Columbia. Watson, Laidlaw.
31. Bennett, John Newton. "The Selective Value of Granting Scholarships in Discovering and Winning Students Who Should Go to College." New York. Hoppock.
32. Bentley, Imogene. "A History and Evaluation of Education Magazines in Texas." Peabody. Riley.
33. Bing, Kenneth L. "Comparative Success at University of Missouri of Students Who Presented Practical Arts Credits for Entrance and Those Who Did Not." Missouri. Selvidge.
34. Bird, Charles A. "The Control of Teachers by School Board Regulations." Fordham. Cronin.
35. Bishop, Helen M. "Quantitative Information of Young Children." Minnesota. Van Wagenen.
36. Blaha, Marion J. "A Survey of the Certification Requirements of Secondary School Teachers in One Hundred Selected Universities and Colleges to Determine the Recent Trends in the Sequence of Required Courses." Washington (Seattle). Draper.
37. Blair, Evelyn. "The Development of Sentiment for Public Education in Mexico from 1821 to 1836." Texas. Arrowood.
38. Blanchard, Leslie. "The Significance of the Tendency to Individualize Education at the College Level." Columbia. Kilpatrick.
39. Bluhm, Solomon. "The Genesis and Establishment of the Board of Education in New York City, 1840–1855." New York. Meyer.
40. Blyton, Gifford. "The Function of Speech-Education in a Democracy." Ohio. Hullfish.
41. Bollinger, Elroy W. "Vocation and Education: A Study of Current Beliefs in General and Vocational Education as a Basis for Developing Improved Relationships." Ohio. Warner.
42. Bollman, Thelma A. "Relation of College Entrance Requirements to the High School Curriculum." Texas. Umstattd.
43. Bonar, Carl. "Provisions for Variation in Social Maturity in Six-Year Secondary Schools." Pittsburgh. Hutson.

44. Bond, G. Maplesden. "Outline of the History of Art for High School Students in the City of New York with Suggestions to Teachers for Its Use." New York. Kissack.
45. Bovard, Berdine. "A History of the Progressive Education Association, 1919–1939." California. Swift.
46. Bower, Philip. "The Relation between Popularity and Mental, Physical and Personality Factors in Adolescent Boys." California. Keys.
47. Boyd, William D. "Higher Education for Negroes in Kentucky in the Light of the Missouri Decision." Cincinnati. Pechstein.
48. Bradley, Burke W. "The Adult Education Responsibilities of the Junior College." Missouri. Carpenter.
49. Bragdon, Clifford R. "A Definitive Study of Appreciation." Harvard.
50. Brainard, Alanson D. "Modernization, Renovation, and Repair of School Plants." Nebraska. Broady.
51. Braun, Edward J. "Standards for School Attendance Areas in Wisconsin." Wisconsin. Fowlkes.
52. Brawley, James P. "A Comparative Analysis of Certain Factors in the Dual Public School System of Georgia with Special Reference to Financial Support." Northwestern. Gellerman.
53. Bream, Robert A. "Construction and Validation of a Course of Study for Consumer Education." Penn State. Peters.
54. Brooks, Daniel A. "The Educational Significance of a Concept of Integration." Pennsylvania. Garver.
55. Brown, Kenneth W. "The Arts in General Education: An Art Program for the Non-Art-Student." Ohio. Warner.
56. Brown, L. C. "In-Service-Training of Teachers." Oklahoma. Bender.
57. Brueggerhoff, Marie. "A Study of Vocational Opportunities in Business Life." Washington (Seattle). Williams.
58. Burger, Florence. "The Program of Social Recreation in Secondary Schools." Pittsburgh. Hutson.
59. Burkhardt, Allen P. "Teacher Morale in Small Schools and How to Improve It." Nebraska. Henzlik.
60. Burkholder, Maurice. "Organization and Administration of Secondary Schools in Mexico." Cincinnati.
61. Burns, Samuel T. "Harmony Needs of Teachers of High School Choral Music." Columbia. Mursell.
62. Bush, Robert Nelson. "A Study of Pupil-Teacher Relationships in the Schools as They Affect Growth and Development of Pupils." Stanford. Quillen.
63. Bute, Kenneth. "A Study of the College Preparation, Teaching Fields, and Other Services of the University of Washington Graduates Teaching in the State of Washington during 1939–1940." Washington (Seattle). Williams.
64. Butler, Louis C. "The Evaluation of Professional Leadership in Physical Education in the Secondary Schools of New Mexico." New York. Lloyd.
65. Cahn, L. Joseph. "Contributions of Plato, Aristotle, Quintilian, Comenius, Locke, and Rousseau to

Thought on Health, Physical Education, and Recreation." New York. Horne.

66. Cain, Ethel M. "A Factor Analysis of Teaching Ability." Wisconsin. Barr.

67. Calvert, Everett T. "Determination of the Difficulty Level of Reading Material." Yale. Tilton.

68. Campbell, Clyde. "Office Management and Clerical Help as Revealed by Case Studies of Small Illinois High Schools." Northwestern. Hughes.

69. Cardall, Alfred J., Jr. "Construction of a Test for Primary Business Interests." Harvard.

70. Carper, Doris. "Number Knowledge of Children When Entering School." Duke. Brownell.

71. Carr, Edwin R. "Cultural and Educational Development of Faribault, Minnesota." Minnesota. Wesley.

72. Carr, Martha G. "The Measurement of the Relative Importance of Various Attitudes of Freshmen High School Girls toward Physical Education Activities and Procedures." Indiana. Patty.

73. Cato, William Hall. "The Higher Education of Women in Virginia." Virginia. Smithey.

74. Cave, Hazel. "The Development of Policies and Procedures to Guide in the Provision for Co-participation of College Men and Women in Recreational Activities." New York. Nash.

75. Cave, Jean. "The Evaluation of Health Protection in Teachers Colleges and Normal Schools." New York. Suhrie.

76. Chaplin, Mildred. "The Function of Philosophy in a Personnel Program." Ohio. Hullfish.

77. Chaykin, Irving J. "The Relationship between Undergraduate Preparation and the Vocational Achievement of Graduates of the School of Business and Civic Administration of the City of New York." New York. Tonne.

78. Church, H. H. "Promotional Practices Affecting the Selection of Teachers in Large City School Systems." Ohio. Lewis.

79. Clark, Archie C. "The Implications for a Teacher Training Policy of the Student Personnel of the Minnesota State Teachers Colleges." Southern California. Weersing.

80. Clark, Harold G. "A Study of Personnel Workers in the Federal Service." George Washington.

81. Clarke, Earl Edward. "Safety Education for Adults in the State of North Dakota." New York. Lloyd.

82. Clifford, Barbara M. "'Hiawatha, An Indian Boy': An Operetta Based on Henry W. Longfellow's Poem." New York. Speer.

83. Cline, Doris. "Present Trends in Personnel Work in Colleges and Universities." Michigan. Myers.

84. Clugston, H. A. "The Scientific Movement in Education." Colorado. Davis.

85. Cobb, Louise S. "The Function of Physical Education in Higher Education." Columbia. Williams, Cottrell.

86. Collins, Even R. "An Historical-Critical Survey of the Training of School Workers in American Universities." Harvard.
87. Connell, John T. "A Comparative Study of Certain Legal Aspects of the Offices of the School District Treasurer and the Treasurer of the Municipal Corporation." Pittsburgh. Yeager.
88. Cook, Sarah. "An Experiment in Teaching a Certain Body of Science Subject Matter in the Upper Elementary School Grades to Discover the Extent to Which Certain Science Generalizations May Be Mastered." California. Kyte.
89. Cooper, Edward Lyle. "Commercial Education in New York State Outside New York City." Northwestern. Hughes.
90. Coover, Shriver L. "The Nature and Measurement of Mechanical Ability." Pittsburgh. Goldberger.
91. Cowling, Archie Halton. "An Investigation of Miguel's Theorem as a Generalization in the Field of Modern Euclidean Geometry." New York. Pieper.
92. Cox, Rachel D. "The Functions of the Counselor in the Secondary School." Pennsylvania. Jones.
93. Crawford, John E. "Indications and Measurement of Mechanical Drafting Aptitude." Pittsburgh. Goldberger.
94. Crespi, Alberta. "Teacher Personnel in the Extra-Territorial Possessions of the United States." Fordham. Cronin.
95. Crombie, Jeanne E. "Alcee Fortier, Scholar, Educator, Historian, 1856–1914." New York. Olinger.
96. Crosby, Richard. "A Study of Students' Preferences as a Basis for Guidance." Cornell. Winsor.
97. Cross, Neal. "Studying Student Library Needs in the Menlo School and Junior College." Stanford. Cross.
98. Crotty, Maurice. "An Analysis and Evaluation of Certain Types of Home Reading by Intermediate Grade Children in Cincinnati." Cincinnati. Hendrickson.
99. Crowe, Fannie M. "An Experiment in Integrating Guidance with the Tenth Grade English Course in the Mt. Vernon Township High School." Colorado State College of Education. Wilson.
100. Cruttenden, E. W. "A Field Study of the Operation of the Official Pennsylvania Teacher Rating System." Penn State. Peters.
101. Cubbon, Edward. "A Personnel Study of the Faculties of West Virginia Colleges Engaged in the Preparation of Teachers of Health and Physical Education." Penn State. Jones.
102. Curtis, Martha. "A Study of Evidence of Science Education Practices Engaged in by the Menomini Indians of North America." Cornell. Palmer.
103. Cuthbert, Marion V. "Education and Racial Marginality." Columbia. Brunner, Walker, Cottrell.
104. Cutler, T. H. "The Standardization of Scales for Measurement of Achievement in Commercial Subjects." Colorado. Davis.
105. Dabney, O. B. "Constitutional and Judicial Interpretations of the Powers of Boards of Education

Governing the Public Elementary and Secondary Schools in Kentucky." Peabody. Cooke.

106. Dalton, Ernest R. "The Effect of the Depression on Public School Finance in Massachusetts." Harvard.

107. Dameron, Vernon G. "Sound Slides in Science Teaching." Harvard.

108. Daniel, Walter G. "The Reading Interests and Needs of Negro College Freshmen in Regard to Social Science Materials." Columbia. Thorndike.

109. Darlington, Meredith W. "A Program for the In-Service Education of Rural Teachers." Nebraska. Broady.

110. Darter, Oscar H. "A Criticism of the Isolation Concept in Colonial American History Found in Textbooks." George Washington.

111. Daugman, John. "Philosophy of Stanislav Shatsky." Pennsylvania. Woody.

112. Davis, Edwin W. "A Technique for the Functional Analysis of Positions in an Occupation." Columbia. Kitson.

113. Davis, Frederick B. "Fundamental Factors in Reading Comprehension: An Analytical Study of the Differences between Good and Poor Readers." Harvard.

114. Davison, Hugh M. "Some Factors in Freshmen Scholastic Success." Harvard.

115. Dean, Arthur R. "An Investigation of the Reading Materials in Social Science in Junior High School." Pittsburgh. Yoakam.

116. Deemer, Walter L., Jr. "An Empirical Comparison of Gregg Shorthand and Script Shorthand Based on Data Collected from Public Secondary Schools." Harvard.

117. DeMay, Amy Janette. "A Study of Fractions in the Ciphering Method of Teaching Arithmetic in the United States, 1600 to 1820." New York. Pieper.

118. Denny, Wayne B. "Consistency in the Application of Science to Education." Yale. Brubacher.

119. Dickerson, Earl Samuel. "The Construction of a Standardized Test in Business Law." New York. Tonne.

120. Dickie, Alexander. "A Study of the Duties of Collegiate Registrars." Texas. Ayer.

121. Diettert, Arvey F. "A Survey and Evaluation of the Reorganized Elementary School." Cincinnati. McNutt, Good.

122. Dimond, Stanley E. "Governmental Attitudes of High-School Seniors." Michigan. Trow.

123. Doane, Donald C. "Needs and Problems of High School Youth." Columbia. Featherstone.

124. Doherty, Frances Marie. "Participation of the Executive in Educational Legislation, 1904–1938." New York. Suhrie.

125. Dollard, William A. S. "The Critical Theories of I. A. Richards and Their Implications for Teachers of English." Columbia. Abbott, Grey.

126. Doob, Dorothy. "An Evaluation of Instructional Material in College Speech Courses: An Experimental Study of the Effects of Four Types of Teaching Media upon Speech and Voice in Conversation." New York. Mulgrave.

127. Dossick, Jesse J. "Education among the Ancient Aztecs." Harvard.

128. Doty, Cornelia Allen. "Prediction of First-Grade Reading Success Under Three Experimental Conditions." Duke. Brownell.

129. Draheim, E. R. "Factors Influencing Parental Understanding and Cooperation in Developing a Sound Community Program of Vocational Agriculture." Cornell. Stewart.

130. Drees, Victor. "The Nature of the Effects of Memory Training." Catholic University. Foran.

131. Drummond, Laura W. "A Study of Recommendations of Undergraduate Students and Alumni of Liberal Arts Colleges Concerning Instruction on Marriage and the Family." Columbia. Judy-Bond.

132. Duncan, Gertrude Inez. "Radio Advertising as a Factor in Health Education." Temple. Lund.

133. DuValle, Sylvester H. "An Evaluation of the Standards of Chemistry Teaching in the Universities and Colleges for Negroes in the United States." New York. Creager.

134. Dyer, Henry S. "The Measurement of Prejudice in Ninth Grade Children." Harvard.

135. Edmiston, Vivian. "An Experimental Appraisal of Certain Types of Units in Socialized Physical Science for Grades Eleven and Twelve." Chicago. Tyler.

136. Eggertsen, Paul. "The Ability of Sub-Marginal Rural Areas in Utah to Maintain Schools and Civil Government." Temple. Owen.

137. Ehlers, Henry James. "The Development of a Simplified Instrumentation for Beginning Music Classes." Pittsburgh. Harris.

138. Ehrlich, Maxwell. "A Study of the School Population of the Staten Island Continuation School." New York. Zorbaugh.

139. Eicher, Chester Franklin. "The Success of North Carolina High School Students in Certain Colleges." Duke. Scates.

140. Eldred, Lewis. "A Critical Analysis of Student Personnel Administration in Northeastern Liberal Arts Colleges." Cornell. Freeman.

141. Ellis, G. Gordon. "An Investigation of Teacher Supply and Demand in Wisconsin for Guidance Purposes." Wisconsin. Edgerton.

142. Engberg, Lila K. "Women's Conflicts: School Emphasis and Purposes as Related to the Role Woman Plays in American Society." Northwestern. Lane.

143. Epler, Stephen. "Persons Honored by Certain Higher Institutions of Learning in the United States at Different Periods." Columbia. Counts.

144. Erickson, Elmer J. "The Influence of Education in the Consumer Cooperative Movement in the United States and Canada." Southern California. Lefever.

145. Ester, Harry E. "The Educational Implications of an Experimental Theory of Value." Northwestern. Axtelle.

146. Etheridge, T. H. "Education in the Republic of Texas." Texas. Eby.

147. Evans, Ralph F. "A Study of Teacher Assignment Practices in Secondary Schools of the North Central Association." Iowa. Newburn.

148. Farquahr, Conchita. "Analysis of Study Reading in Intermediate Grades." Boston. Durrell.

149. Fenner, Mildred S. "A History of the National Education Association." George Washington.

150. Ferguson, Thomas S. "A Program of Physical Education for the State of Maryland." George Washington.

151. Fessenden, Seth A. "The Relationship between Speech and Success in Teaching." New York. Barnes.

152. Fisher, John J. "The Extent to Which Certain Elements of Teaching Equipment Contribute to Teaching Success as Represented by Measurable Changes in Pupils." Columbia. Evenden.

153. Fitch, Faith Lee. "The Relationships between Information, Insights, and Attitudes in an Area of Science Closely Related to Economic and Political Problems." Columbia. Powers, Lorge.

154. Fite, D. Harley. "Subsistence Farming in Relation to Rural Schools in the South." Peabody. Frost.

155. Fogarty, Jerry J. "A Program for the Utilization of Regional Materials in the Pacific Northwest." Washington (Seattle). Draper.

156. Fox, Lorene. "An Analysis and Appraisal of Social Participation as a Part of the Elementary School Curriculum." Columbia. Childs, Osborne.

157. French, John S. "Teacher Employment: Trends and Relationships." Columbia. Evenden, Lorge.

158. Frick, H. L. "The Core Curriculum in the Secondary School with a Proposal for a Curriculum Improvement in the High Schools of South Carolina." Ohio. Alberty.

159. Fuller, Donald C. "Reading Factors in Typewriting." Harvard.

160. Fuller, Frank. "The History of Public High School Evaluation, 1870–1932." Yale. Hill.

161. Gainsburg, Joseph C. "Experimental Investigation of a Homogeneous Grouping Method in a New York City School." New York. Dearborn.

162. Gallup, Gladys G. "Contribution of the Home Economics Extension Program to the Needs of Rural Families." George Washington.

163. Ganzel, Dewey A. "Laws, Rules, and Regulations Governing School Building Procedures." New York. Meredith.

164. Gardner, Carl A. "Practices of Public Secondary School Alumni Organizations in the United States." New York. Cox.

165. Garrett, James. "School Achievement as Related to the Various Elements of the Stanford-Binet Intelligence Test." New York. Tomlinson.

166. Gear, Harold L. "The History of the Professionalization of the Superintendency." Harvard.

167. Geigle, Francis. "A Study of the Preparation of Commercial Teachers in the Public Secondary Schools of New Jersey." New York. Lomax.

168. Geissinger, John B. "The Evolution of the Legal Status of the City Superintendent of Schools." Pennsylvania. Reller.

169. Genovese, Clarence T. "Pupil Evaluation of Homeroom Programs." Pittsburgh. Hutson.

170. George, N. L. "History of the Oklahoma State Board of Education." Peabody. Strayer.

171. Ghiradella, R. "A Descriptive Study of Unsponsored Clubs and Other Groups in a Local Area in New York City." New York. Thrasher.

172. Gibson, Joseph E. "Planning in the Administration of Public Education in Mississippi, 1817 to 1935." Columbia. Strayer.

173. Giddens, Lucion. "The Development of Higher Education for Women in the South since 1880." Peabody. Cooke.

174. Giles, Fred. "The Development of Courses in Art in Southern Teachers Colleges." Peabody. Crabb.

175. Gilger, George. "A Comparative Study of the School Populations of the New York State Schools of Agriculture at Alfred, Canton, and Morrisville." Syracuse. Smith.

176. Gill, Clayton. "John Dewey's Theory of Evaluation and Its Bearing on Educational Theory and Practice." Northwestern. Axtelle.

177. Gladfelter, M. E. "The Reading Ability of College Freshmen." Pennsylvania. Grizzell.

178. Goetz, Salome. "Children's Paintings and Personality Differences." California. Bailey.

179. Goldstein, Henry M. "Relation of Large and Small Classes in the Early Elementary Grades to Scholastic and Other Outcomes." New York. Speer.

180. Goodman, David J. "Comparative Effectiveness of Pictorial Teaching Aids." New York. Knowlton.

181. Gordon, Laurin P. "Case Studies of Elementary School Teaching." Wisconsin. Barr.

182. Gosnell, Charles F. "The Rate of Obsolescence in College Library Book Collections as Determined by an Analysis of Three Selected Lists of Books for College Libraries." New York. West.

183. Gotschall, John H. "The Travelling Psychological Clinics of Massachusetts." Harvard.

184. Grafflin, Douglas A. "Sources of Private Day School Enrollment in Brooklyn, New York." New York. Meredith.

185. Graham, Harriet K. "A Study of the Possible Relationships between Certain Standing Postures and the Energy Consumed in Maintaining Them." Columbia. Brownell.

186. Graves, Rachel. "An Integrated Guidance Program for the Fourth Grade in a Small Town." Colorado State College of Education. McKee.

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192. Griswold, Nat R. "Analysis and Evaluation of Current Programs and Proposals Concerning the Teaching of Religion in Connection with Public Education." Columbia. Johnson, Childs.

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194. Hackett, W. A. "A Study and Tentative Solution of the Educational Problem Presented by Dialectic Pronunciations in the Southern Appalachian Mountains." Ohio. Seely.

195. Hadley, Loren S. "A Study of the Leisure Activities of Adults." Ohio. Charters.

196. Haggard, E. H. "Shift in Syllable Stress in Words of French Origin between Chaucer and Spenser." Peabody. Roehm.

197. Haggarty, Lida. "An Empirical Case of the Accomplishment Quotient: A Four-Year Study of Intelligence and Achievement at the Intermediate Level." California. Keys.

198. Hall, C. C. "High School Science Students' Preferences for Illustrative Materials." Colorado State. College of Education. Wrinkle.

199. Halstead, Kenneth O. "The Nature of Reading Ability in General Science on the Ninth Grade Level." Columbia. Strang, Walker

200. Hamilton, William J. "The Development of Private Business Schools in the United States." Pennsylvania. Grizzell.

201. Hamlin, C. H. "Social and Economic Aspects of Public School Development in North Carolina since 1870." Peabody. Strayer.

202. Hammock, Robert C. "The Student Teaching Program for Secondary School Teachers." Texas. Umstattd.

203. Han, Ching-lien. "A Comparison of the Administration of Publicly Supported Institutions for Higher Education in China and the U. S." Minnesota. Neale.

204. Hannon, Maurice A. "Critical Points in Abilities Associated with Teaching Efficiency." Wisconsin. Barr.

205. Hansen, Ken. "A Philosophical Study of the Teaching of Language and Music in Public Schools." Oklahoma. Ortman.

206. Harlow, James. "Teaching Physics for Human Control of Power." Oklahoma. Ortman.

207. Harned, Ray. "Edwin Anderson Alderman as an Educator." New York. Horne.

208. Harrington, B. C. "The Development of Junior Colleges from Private Secondary Schools." Columbia. Evenden, Tewksbury.

209. Harrington, Eleanor. "The Non-School Use of Public School Property." Fordham. Cronin.

210. Harrington, Wells. "A Study of Written Recommendations and Teacher Appointment." Columbia. Linton.

211. Harris, Theodore L. "A Laboratory Study of Certain Factors Which Affect the Span of Recognition in Silent Reading." Chicago. Gray.

212. Harrison, Ike H. "A Syllabus in Advanced Business Training for Rural High Schools of Texas." New York. Reynolds.

213. Hartley, Leslie L. "An Analysis and Evaluation of the Activities of the U. S. Office of Education since 1933." Colorado. Grieder.

214. Hartzell, Ralph E. "Maturation as a Factor in Musical Development." Cincinnati. Hendrickson.

215. Hauptman, Leo. "An Evaluation of Some Instrumentalities for In-Service Training in Secondary Schools." Nebraska. Rosenlof.

216. Hawes, E. B. "A Study of the Summer School as a Teacher Training Session." Ohio. Klein.

217. Hawker, J. Marvin. "A Study of the Elimination of College Students at the University of Kansas." Kansas. Turney.

218. Hayhow, Edgar C. "A Proposed Training Opportunity for Lay Personnel in Three Areas of Hospital Service." New York. Brown.

219. Hays, Mahela. "Basal Metabolism in Adolescence and Its Relation to Certain Measures of Physical Status and School Success." California. Bailey.

220. Healey, James H., Jr. "The Social Philosophy of Leslie Stephen." New York. Barnes.

221. Hendrickson, Andrew. "A Study of Recent Trends in Public School Adult Education in Certain Cities in the United States." Columbia. Hallenbeck.

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225. Higgins, Conwell. "The Educability of Adolescents as to the Mental Factor of Induction." New York. Pieper.

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